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ABSTRACT

The Computer-Assisted Data Analysis (CADA) Monitor is a set of conversational-language interactive computer programs that permit relatively inexperienced persons to perform relatively complex statistical data analysis. The Monitor leads the user through an analysis on a step-by-step basis providing the necessary direction, information, and computation at each stage of the analysis. Work completed under the current project has provided for enhanced facilities for data management, matrix manipulation, and utility elicitation. New components were developed for decision analysis, full-rank ANOVA and MANOVA and multiple regression. The CADA Display Book provides examples of the use of the CADA Monitor. (Author)

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Display Book for The Computer-Assisted Data Analysis (CADA) Monitor (1980)

Prepared by

David L. Libby, James J. Chen,
George G. Woodworth, Dattaprasad R. Divgi, and Shin-ichi Mayekawa

The University of Iowa

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INTRODUCTION

The CADA Display Book provides examples of the use of the CADA Monitor. Although it is not possible to show an example use of every option in the Monitor, because of the vast number of options, the Display Book gives examples of every module in every model of every component in all component groups. The Display Book is divided by component group.

The examples in the Display Book have been used to test the Basic dialect translations. These examples should be used to test the implementation of CADA at individual installations as well. Since these are reasonable analyses, furthermore, they may also be used as an aid in learning to use the Monitor. One may follow an example, slightly varying the responses to see the consequencs.

The table of Contents indexes the individual components within the component groups. For some of the components, a data set is required; thus, the examples for those components begin in Component Group 1. Data Management Facility.

Component Group 1

```
COMPONENT GROUPS

1.    DATA MANAGEMENT FACILITY
2.    SIMPLE BAYESIAN PARAMETRIC MODELS
3.    DECISION THEORETIC MODELS
4.    BAYESIAN SIMULTANEOUS ESTIMATION
5.    BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.    BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.    ELEMENTARY CLASSICAL STATISTICS
8.    EXPLORATORY DATA ANALYSIS
9.    PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?1
```

```
COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12.  DATA MOVEMENT      ( INPUT/OUTPUT, EDITING )
13.  DATA TRANSFORMATIONS
14.  FILE MAINTENANCE  ( DATA GROUPING )

    * NOT YET AVAILABLE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?12
```

COMPONENT 12. DATA MOVEMENT

1. DATA ENTRY AND TRANSFERS
2. DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0')?1

MODEL 1. DATA ENTRY AND TRANSFERS

1. DATA ENTRY FROM THE TERMINAL
2. DATA TRANSFER FROM DISK
3. DATA TRANSFER FROM THE CATALOG

4. DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0')?1

DATA ENTRY FROM THE TERMINAL

```
YOU CAN CONSTRUCT A DATA SET WITH A MAXIMUM OF 1000 ENTRIES.
THE DATA MAY BE GROUPED (MAX=12) OR UNGROUPED, UNIVARIATE
OR MULTIVARIATE (MAX=5).

     1. UNGROUPED UNIVARIATE
     2. UNGROUPED MULTIVARIATE
     3. GROUPED UNIVARIATE
     4. GROUPED MULTIVARIATE

ENTER THE NUMBER OF THE KIND OF DATA YOU HAVE.?2
```

UNGROUPED MULTIVARIATE DATA

```
ENTER THE NUMBER OF VARIABLES  ( MAX=5 ). TO EXIT, TYPE '0'.?3

YOU CAN EITHER SPECIFY THE VARIABLE NAMES OR LET THE
MODULE ASSIGN THE NAMES VAR-01, VAR-02, ETC..

     TO USE DEFAULT NAMES,   TYPE '1'.
     TO ASSIGN NAMES,        TYPE '2'.?1

ENTER THE NUMBER OF OBSERVATIONS  ( MAX= 333 ). TO EXIT, TYPE '0'.?7
```

```
ENTER THE VARIABLE VALUES FOR THIS SET OF OBSERVATIONS.
ENTER THE VALUES SEPARATED BY COMMAS.  FOR EXAMPLE, IF THERE ARE
TWO VARIABLES AND THE VALUES ARE 4 AND 5 FOR THE FIRST OBSERVATION,
YOU SHOULD ENTER :  '4,5'.


OBSERVATIONS      1  -   7
VARIABLES       VAR-01   VAR-02   VAR-03
-------------------------------------------------------
OBS.    1 :?7,26,78.5
OBS.    2 :?1,19,74.3
OBS.    3 :?11,56,104.3
OBS.    4 :?11,31,87.6
OBS.    5 :?7,52,95.9
OBS.    6 :?11,55,109.2
OBS.    7 :?3,71,102.7
-------------------------------------------------------
IF YOU WANT TO CONTINUE ENTERING DATA,          TYPE '1'.
IF YOU WANT TO EDIT THIS SET OF OBSERVATIONS, TYPE '2'.
IF YOU WANT TO STOP ENTERING DATA,              TYPE '3'.?3
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.

     TO KEEP THE DATA ENTERED,    TYPE '1'.
     TO IGNORE THE DATA ENTERED,  TYPE '2'.?1
```

```
        DESCRIPTION OF DATA SET

VARIABLES
 1. VAR-01
 2. VAR-02
 3. VAR-03

NUMBER OF OBSERVATIONS =     7

IF YOU WANT TO PROCEED TO AN ANALYSIS,    TYPE '1'.
IF YOU WANT TO REMAIN IN DATA MANAGEMENT, TYPE '2'.?2
```

```
     COMPONENT 12.  DATA MOVEMENT

     1.  DATA ENTRY AND TRANSFERS
     2.  DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' )?1
```

```
MODEL 1.  DATA ENTRY AND TRANSFERS

     1.   DATA ENTRY FROM THE TERMINAL
     2.   DATA TRANSFER FROM DISK
     3.   DATA TRANSFER FROM THE CATALOG

     4.   DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER ( ELSE '0' )?4
```

```
                 DATA TRANSFER TO DISK

YOU MUST HAVE A WRITE PASSWORD IN ORDER TO TRANSFER YOUR DATA
TO A DISK FILE.  IF YOU DO NOT HAVE ONE, YOU SHOULD CHECK WITH
THE CADA SYSTEM MANAGER.

ENTER YOUR PASSWORD  ( ELSE 'NONE' ).?JUNIOR

THERE ARE DATA STORED IN THE FILE WITH THIS PASSWORD.

IF YOU WANT TO ERASE THESE DATA, TYPE '1'  ( ELSE '0' ).?1

ENTER THE NAME YOU WANT TO ASSIGN TO THE DATA SET (MAX=6).?HALD
```

```
HERE IS A DESCRIPTION OF THE DATA SET.

NAME=HALD
NUMBER OBSERVATIONS= 7

VARIABLES
    VAR-01
    VAR-02
    VAR-03

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1
```

```
     MODEL 1.  DATA ENTRY AND TRANSFERS

     1.  DATA ENTRY FROM THE TERMINAL
     2.  DATA TRANSFER FROM DISK
     3.  DATA TRANSFER FROM THE CATALOG

     4.  DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER ( ELSE '0' )?3
```

```
THE DATA FILE CATALOG

  1. ITBS SCORES, SCHOOL #1
  2. ITBS SCORES, SCHOOL #14
  3. ESAA PILOT PROGRAM
  4. IOWA COUNTY DATA
  5. SAMPLE REGRESSION DATA
  6. SAMPLE ANOVA DATA
  7. SAMPLE MANOVA DATA
  8. JUNIOR COLLEGE ACT SCORES

IF YOU WANT AN AVAILABLE DATA SET, TYPE ITS NUMBER ( ELSE '0' ).?5

TO TRANSFER THESE DATA TO YOUR WORK FILE, TYPE '1'.
TO OBTAIN A DESCRIPTION OF THESE DATA,    TYPE '2'.?2


         DATA SET #5 :  SAMPLE REGRESSION DATA

THIS DATA SET CONTAINS DATA ON THE FOLLOWING 4 VARIABLES:

         ENGLISH      --  ACT SCORES, 1968
         MATH         --  ACT SCORES, 1968
         NATURAL SCI  --  ACT SCORES, 1968
         GPA          --  JUNIOR COLLEGE 1ST SEMESTER GPA.

THE DATA ON THE FOUR VARIABLES ARE GROUPED INTO 10 SETS.  THESE
GROUPS CORRESPOND TO 10 HOMOGENEOUS JUNIOR COLLEGES.  THERE ARE
TWENTY-FIVE OBSERVATIONS FROM EACH JUNIOR COLLEGE.

IF YOU WANT TO USE THIS DATA SET, TYPE '1' ( ELSE '0' ).?1
```

```
THE DATA SET IS NOW IN THE PERSONAL FILE.  IT WILL REMAIN THERE
UNTIL YOU SIGN OFF THE MONITOR OR REPLACE IT WITH ANOTHER DATA
SET.

IF YOU WISH TO PROCEED TO AN ANALYSIS,     TYPE '1'.
IF YOU WISH TO REMAIN IN DATA MANAGEMENT, TYPE '2'.?2
```

```
          MODEL 1.  DATA ENTRY AND TRANSFERS

          1.   DATA ENTRY FROM THE TERMINAL
          2.   DATA TRANSFER FROM DISK
          3.   DATA TRANSFER FROM THE CATALOG

          4.   DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER ( ELSE '0' )?0
```

```
COMPONENT 12.  DATA MOVEMENT

1.  DATA ENTRY AND TRANSFERS
2.  DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' )?0
```

```
COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12.  DATA MOVEMENT     ( INPUT/OUTPUT, EDITING )
13.  DATA TRANSFORMATIONS
14.  FILE MAINTENANCE  ( DATA GROUPING )

    * NOT YET AVAILABLE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?13
```

COMPONENT 13. DATA TRANSFORMATIONS

1. NULLARY, UNARY, AND BINARY OPERATIONS
2. SUFFICIENT STATISTICS
3. MATRIX OPERATIONS

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0')?1

NULLARY, UNARY, AND BINARY OPERATIONS

THIS MODEL ALLOWS YOU TO MODIFY THE VALUES OF THE DATA ELEMENTS IN YOUR DATA SET AND CREATE NEW DATA ELEMENTS. AT THE CONCLUSION OF THIS MODEL, THE DATA SET IN YOUR PERSONAL FILE WILL BE REPLACED BY THE TRANSFORMED ONE.

YOU MAY PASS SOME OF THE DATA ELEMENTS TO THE NEW DATA SET UNCHANGED, BY NEVER MODIFIYING THE VALUES; NOTE, HOWEVER, THAT THE SIZE OF THE DATA SET IS RESTRICTED TO NO MORE THAN 5 DATA ELEMENTS AND TO NO MORE THAN 1000 VALUES TOTAL (NUMBER OF DATA ELEMENTS * NUMBER OF OBSERVATIONS).

THEREFORE, IF YOU WISH TO RETAIN YOUR DATA SET AS IT CURRENTLY EXISTS, YOU MUST STORE IT IN A DATA FILE ON SOME MAGNETIC STORAGE DEVICE (E.G., DISK) USING THE DATA MOVEMENT COMPONENT.

TO PROCEED TO THE DEFINITION OF THE OPERATIONS, TYPE '1'.
TO STORE YOUR CURRENT DATA SET, TYPE '2'.
TO OBTAIN FURTHER EXPLANATION OF THIS MODEL, TYPE '3'.?1

```
                    **OPERATIONS**                                  **DATA ELEMENTS**
      NULLARY            UNARY                  BINARY              FILE        TEMP

  1. IF             101. X=NOT Y           201. X=Y AND Z      1. ENGLSH  -1. UNUSED
  2. THEN                                  202. X=Y OR Z       2.  MATH   -2. UNUSED
  3. ELSE           103. X=Y               203. X=Y EQ Z       3. NATSCI  -3. UNUSED
  4. BEGIN          104. X=-Y              204. X=Y NE Z       4.  GPA    -4. UNUSED
  5. END            105. X=1/Y             205. X=Y LT Z                  -5. UNUSED
                    106. X=ABS(Y)          206. X=Y LE Z                  -6. OBS #
                    107. X=SIGN(Y)         207. X=Y GT Z                   0. CONST.
                    108. X=INT(Y)          208. X=Y GE Z
                    109. X=SQR(Y)
                    110. X=EXP(Y)          210. X=Y+Z
 11. X=UNIF[0,1)    111. X=LOG(Y)          211. X=Y-Z
 12. X=NORM(0,1)    112. X=LOG10(Y)        212. X=Y*Z
                    113. X=SIN(Y)          213. X=Y/Z
                    114. X=COS(Y)          214. X=Y^Z
                    115. X=TAN(Y)          215. X=LOGY(Z)
                    116. X=ATN(Y)          216. X=MAX(Y,Z)
                    117. X=LOGODDS(Y)      217. X=MIN(Y,Z)
                    118. X=ASINSQR(Y)
                    119. X=TRUNC(Y)

ENTER AN OPERATION CODE  ( ENTER '0' TO TERMINATE ).?1
```

```
                    **OPERATIONS**                                  **DATA ELEMENTS**
      NULLARY            UNARY                  BINARY              FILE        TEMP

  1. IF             101. X=NOT Y           201. X=Y AND Z      1. ENGLSH  -1. UNUSED
  2. THEN                                  202. X=Y OR Z       2.  MATH   -2. UNUSED
  3. ELSE           103. X=Y               203. X=Y EQ Z       3. NATSCI  -3. UNUSED
  4. BEGIN          104. X=-Y              204. X=Y NE Z       4.  GPA    -4. UNUSED
  5. END            105. X=1/Y             205. X=Y LT Z                  -5. UNUSED
                    106. X=ABS(Y)          206. X=Y LE Z                  -6. OBS #
                    107. X=SIGN(Y)         207. X=Y GT Z                   0. CONST.
                    108. X=INT(Y)          208. X=Y GE Z
                    109. X=SQR(Y)
                    110. X=EXP(Y)          210. X=Y+Z
 11. X=UNIF[0,1)    111. X=LOG(Y)          211. X=Y-Z
 12. X=NORM(0,1)    112. X=LOG10(Y)        212. X=Y*Z
                    113. X=SIN(Y)          213. X=Y/Z
                    114. X=COS(Y)          214. X=Y^Z
                    115. X=TAN(Y)          215. X=LOGY(Z)
                    116. X=ATN(Y)          216. X=MAX(Y,Z)
                    117. X=LOGODDS(Y)      217. X=MIN(Y,Z)
                    118. X=ASINSQR(Y)
                    119. X=TRUNC(Y)

ENTER AN OPERATION CODE  ( ENTER '0' TO TERMINATE ).?205
```

```
OPERATION :   205. X=Y LT Z              **DATA ELEMENTS**
                                          FILE          TEMP

                                      1. ENGLSH    -1. UNUSED
                                      2.  MATH     -2. UNUSED
                                      3. NATSCI    -3. UNUSED
                                      4.  GPA      -4. UNUSED
                                                   -5. UNUSED
                                                   -6. OBS #
                                                    0. CONST.

ENTER THE NUMBER OF THE DESTINATION DATA ELEMENT ('X').?-1

   THE DATA ELEMENT IS CURRENTLY 'UNUSED'.  IF YOU WISH :
       TO SPECIFY A NEW NAME,           TYPE '1'.
       TO USE A DEFAULT NAME,           TYPE '2'.?2

ENTER THE NUMBER OF A DATA ELEMENT FOR THE FIRST ARGUMENT  ('Y').?4

ENTER THE NUMBER OF THE SECOND ARGUMENT  ('Z').?0
      ENTER THE VALUE OF THE CONSTANT.?2




                  **OPERATIONS**                                    **DATA ELEMENTS**
     NULLARY           UNARY                  BINARY                 FILE         TEMP

  1. IF           101. X=NOT Y          201. X=Y AND Z           1. ENGLSH   -1. TEM-01
  2. THEN                               202. X=Y OR Z            2.  MATH    -2. UNUSED
  3. ELSE         103. X=Y              203. X=Y EQ Z            3. NATSCI   -3. UNUSED
  4. BEGIN        104. X=-Y             204. X=Y NE Z            4.  GPA     -4. UNUSED
  5. END          105. X=1/Y            205. X=Y LT Z                        -5. UNUSED
                  106. X=ABS(Y)         206. X=Y LE Z                        -6. OBS #
                  107. X=SIGN(Y)        207. X=Y GT Z                         0. CONST.
                  108. X=INT(Y)         208. X=Y GE Z
                  109. X=SQR(Y)
                  110. X=EXP(Y)         210. X=Y+Z
 11. X=UNIF[0,1)  111. X=LOG(Y)         211. X=Y-Z
 12. X=NORM(0,1)  112. X=LOG10(Y)       212. X=Y*Z
                  113. X=SIN(Y)         213. X=Y/Z
                  114. X=COS(Y)         214. X=Y^Z
                  115. X=TAN(Y)         215. X=LOGY(Z)
                  116. X=ATN(Y)         216. X=MAX(Y,Z)
                  117. X=LOGODDS(Y)     217. X=MIN(Y,Z)
                  118. X=ASINSQR(Y)
                  119. X=TRUNC(Y)

ENTER AN OPERATION CODE  ( ENTER '0' TO TERMINATE ).?2
```

```
                    **OPERATIONS**                                              **DATA ELEMENTS**
   NULLARY               UNARY                      BINARY                 FILE         TEMP

 1. IF              101. X=NOT Y           201. X=Y AND Z          1. ENGLSH   -1. TEM-01
 2. THEN                                   202. X=Y OR Z           2.  MATH    -2. UNUSED
 3. ELSE            103. X=Y               203. X=Y EQ Z           3. NATSCI   -3. UNUSED
 4. BEGIN           104. X=-Y              204. X=Y NE Z           4.  GPA     -4. UNUSED
 5. END             105. X=1/Y             205. X=Y LT Z                       -5. UNUSED
                    106. X=ABS(Y)          206. X=Y LE Z                       -6. OBS #
                    107. X=SIGN(Y)         207. X=Y GT Z                        0. CONST.
                    108. X=INT(Y)          208. X=Y GE Z
                    109. X=SQR(Y)
                    110. X=EXP(Y)          210. X=Y+Z
11. X=UNIF[0,1)     111. X=LOG(Y)          211. X=Y-Z
12. X=NORM(0,1)     112. X=LOG10(Y)        212. X=Y*Z
                    113. X=SIN(Y)          213. X=Y/Z
                    114. X=COS(Y)          214. X=Y^Z
                    115. X=TAN(Y)          215. X=LOGY(Z)
                    116. X=ATN(Y)          216. X=MAX(Y,Z)
                    117. X=LOGODDS(Y)      217. X=MIN(Y,Z)
                    118. X=ASINSQR(Y)
                    119. X=TRUNC(Y)

ENTER AN OPERATION CODE  ( ENTER '0' TO TERMINATE ).?103




OPERATION :  103. X=Y                    **DATA ELEMENTS**
                                          FILE         TEMP

                                      1. ENGLSH   -1. TEM-01
                                      2.  MATH    -2. UNUSED
                                      3. NATSCI   -3. UNUSED
                                      4.  GPA     -4. UNUSED
                                                  -5. UNUSED
                                                  -6. OBS #
                                                   0. CONST.

ENTER THE NUMBER OF THE DESTINATION DATA ELEMENT ('X').?4

   THE DATA ELEMENT IS CURRENTLY ' GPA   ',  IF YOU WISH :
       TO SPECIFY A NEW NAME,          TYPE '1'.
       TO USE A DEFAULT NAME,          TYPE '2'.
       TO LEAVE THE NAME AS IT IS,     TYPE '3'.?3

ENTER THE NUMBER OF A DATA ELEMENT FOR THE ARGUMENT  ('Y').?0
      ENTER THE VALUE OF THE CONSTANT.?0
```

```
                       **OPERATIONS**                                         **DATA ELEMENTS**
     NULLARY               UNARY                   BINARY                      FILE        TEMP

  1. IF              101. X=NOT Y           201. X=Y AND Z            1. ENGLSH   -1. TEM-01
  2. THEN                                   202. X=Y OR Z             2.  MATH    -2. UNUSED
  3. ELSE            103. X=Y               203. X=Y EQ Z             3. NATSCI   -3. UNUSED
  4. BEGIN           104. X=-Y              204. X=Y NE Z             4.  GPA     -4. UNUSED
  5. END             105. X=1/Y             205. X=Y LT Z                         -5. UNUSED
                     106. X=ABS(Y)          206. X=Y LE Z                         -6. OBS #
                     107. X=SIGN(Y)         207. X=Y GT Z                          0. CONST.
                     108. X=INT(Y)          208. X=Y GE Z
                     109. X=SQR(Y)
                     110. X=EXP(Y)          210. X=Y+Z
 11. X=UNIF[0,1)     111. X=LOG(Y)          211. X=Y-Z
 12. X=NORM(0,1)     112. X=LOG10(Y)        212. X=Y*Z
                     113. X=SIN(Y)          213. X=Y/Z
                     114. X=COS(Y)          214. X=Y^Z
                     115. X=TAN(Y)          215. X=LOGY(Z)
                     116. X=ATN(Y)          216. X=MAX(Y,Z)
                     117. X=LOGODDS(Y)      217. X=MIN(Y,Z)
                     118. X=ASINSQR(Y)
                     119. X=TRUNC(Y)

ENTER AN OPERATION CODE  ( ENTER '0' TO TERMINATE ).?0
```

```
                     OPERATION EDITOR

NUMBER CODE OPERATION               X                 Y                 Z

   1.     1. IF
   2.   205. X=Y LT Z           -1. TEM-01      4.   GPA            2.000
   3.     2. THEN
   4.   103. X=Y                 4.   GPA           0.000

       TO CHANGE AN OPERATION,                            TYPE '1'.
       TO DELETE ONE OR MORE OPERATIONS,                  TYPE '2'.
       TO INSERT ONE OR MORE OPERATIONS,                  TYPE '3'.
       TO CONTINUE TO THE NEXT PAGE,                      TYPE '4'.
       TO SPECIFY A DIFFERENT PAGE OF OPERATIONS,         TYPE '5'.
       TO EXECUTE THE OPERATIONS,                         TYPE '9'.?9
```

***** WARNING *****

ANY DATA STORED AS TEMPORARY DATA ELEMENTS WILL NOT BE RETAINED FOR THE NEW, TRANSFORMED DATA SET. ANY DATA THAT YOU WISH TO KEEP MUST BE STORED AS FILE DATA ELEMENTS.

TO MOVE DATA FROM THE TEMPORARY DATA ELEMENTS TO THE FILE DATA ELEMENTS, YOU SHOULD RETURN TO THE OPERATION EDITOR AND 'INSERT' OPERATIONS AT THE END OF THE COLLECTION. THE OPERATION THAT YOU SHOULD USE IS THE IDENTITY OPERATION (I.E., 'X=Y').

IF YOU WANT TO EXECUTE THE OPERATIONS, TYPE '1'.
IF YOU WANT TO RETURN TO THE EDITOR, TYPE '2'.?1

PLEASE BE PATIENT WHILE THE TRANSFORMATIONS ARE PROCESSED...

DATA TRANSFORMATION

```
THE TRANSFORMATIONS HAVE BEEN COMPLETED.

YOU HAVE THE FOLLOWING DATA ELEMENTS IN YOUR FILE.  FOR EACH,
PLEASE INDICATE WITH THE APPROPRIATE INTEGER THAT YOU WANT :

       TO KEEP IT AS IS            ( TYPE '1' );
       TO KEEP AND RENAME IT       ( TYPE '2' );
       TO DELETE IT                ( TYPE '0' ).

ENGLSH?1
 MATH ?1
NATSCI?1
 GPA  ?1
```

DATA SET INFORMATION

NAME = COLDAT

NO.	DATA ELEMENTS	GROUPS	NUMBER OF OBSERVATIONS
1.	ENGLSH	COLL6	25
2.	MATH	COLL7	25
3.	NATSCI	COLL8	25
4.	GPA	COLL9	25
5.		COLL10	25
6.		COLL11	25
7.		COLL12	25
8.		COLL13	25
9.		COLL15	25
10.		COLL19	25

TOTAL NUMBER OF OBSERVATIONS = 250

TO CONTINUE,   TYPE '1'.?1

```
COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12.  DATA MOVEMENT      ( INPUT/OUTPUT, EDITING )
13.  DATA TRANSFORMATIONS
14.  FILE MAINTENANCE  ( DATA GROUPING )

    * NOT YET AVAILABLE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?12
```

```
     COMPONENT 12.  DATA MOVEMENT

     1.  DATA ENTRY AND TRANSFERS
     2.  DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' )?2
```

```
          DATA  EDITING

     1. DISPLAY AND EDIT OBSERVATIONS
     2. ADD OBSERVATIONS
     3. ADD VARIABLES
     4. DELETE VARIABLES
     5. CHANGE VARIABLE NAMES

ENTER THE NUMBER OF THE OPTION YOU WANT  ( ELSE '0' )?1
```

```
DATA SET NAME = COLDAT

GROUPS:        NAME                 SIZE

           1 = COLL6               25
           2 = COLL7               25
           3 = COLL8               25
           4 = COLL9               25
           5 = COLL10              25
           6 = COLL11              25
           7 = COLL12              25
           8 = COLL13              25
           9 = COLL15              25
          10 = COLL19              25

ENTER THE NUMBER OF THE GROUP YOU WANT   ( NONE=0 ).?1
```

```
DATA SET = COLDAT      GROUP =  1:  COLL6      NO. OF OBS. = 25

                                      VARIABLES
  OBS.       1=ENGLSH  2= MATH   3=NATSCI  4= GPA

OBSERVATIONS WILL BE DISPLAYED IN BLOCKS OF 10  (ENTER '0,0' TO EXIT).
ENTER THE 'FIRST,LAST' OBSERVATION NUMBERS TO BE DISPLAYED?1,10
```

```
DATA SET = COLDAT      GROUP =  1:  COLL6      NO. OF OBS. = 25

                                      VARIABLES
  OBS.       1=ENGLSH  2= MATH   3=NATSCI  4= GPA
-------------------------------------------------------------
  1.            22.00      19.00      31.00      2.40
  2.            12.00      18.00      12.00      0.00
  3.            19.00      18.00      22.00      3.00
  4.             6.00      15.00      10.00      0.00
  5.             9.00      16.00      14.00      2.50
  6.            17.00      11.00      20.00      3.00
  7.             9.00      20.00      25.00      0.00
  8.            21.00      12.00      25.00      2.80
  9.            19.00      11.00      16.00      0.00
 10.            17.00      19.00      15.00      0.00
-------------------------------------------------------------
     1. CONTINUE WITHOUT EDITING
     2. DELETE AN OBSERVATION
     3. CHANGE AN OBSERVATION
     4. REDISPLAY THE OBSERVATIONS
     5. REINSTATE A DELETED OBSERVATION

ENTER THE NUMBER OF THE OPTION YOU WANT  ( ELSE '0' )?0
```

DATA EDITING

1. DISPLAY AND EDIT OBSERVATIONS
2. ADD OBSERVATIONS
3. ADD VARIABLES
4. DELETE VARIABLES
5. CHANGE VARIABLE NAMES

ENTER THE NUMBER OF THE OPTION YOU WANT (ELSE '0')?0

HERE IS A DESCRIPTION OF THE DATA SET.

NAME=COLDAT

VARIABLES
1. ENGLSH
2. MATH
3. NATSCI
4. GPA

GROUP	1	NAME = COLL6	SIZE= 25
GROUP	2	NAME = COLL7	SIZE= 25
GROUP	3	NAME = COLL8	SIZE= 25
GROUP	4	NAME = COLL9	SIZE= 25
GROUP	5	NAME = COLL10	SIZE= 25
GROUP	6	NAME = COLL11	SIZE= 25
GROUP	7	NAME = COLL12	SIZE= 25
GROUP	8	NAME = COLL13	SIZE= 25
GROUP	9	NAME = COLL15	SIZE= 25
GROUP	10	NAME = COLL19	SIZE= 25

TOTAL NUMBER OBSERVATIONS = 250

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

COMPONENT 12. DATA MOVEMENT

1. DATA ENTRY AND TRANSFERS
2. DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0')?1

MODEL 1. DATA ENTRY AND TRANSFERS

1. DATA ENTRY FROM THE TERMINAL
2. DATA TRANSFER FROM DISK
3. DATA TRANSFER FROM THE CATALOG

4. DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0')?2

DATA TRANSFER FROM DISK

THE PURPOSE OF THIS MODULE IS TO ALLOW YOU TO TRANSFER INTO YOUR WORK FILE A DATA SET THAT YOU HAVE PREVIOUSLY STORED ON DISK.

IF YOU DO NOT HAVE A DATA SET STORED IN A FILE ON DISK BUT WANT TO ENTER ONE FROM THE TERMINAL, YOU SHOULD USE MODULE 1. DATA ENTRY FROM THE TERMINAL.

```
ENTER THE NAME OF YOUR DATA SET ON DISK  ( ELSE 'NONE' ).?HALD
ENTER THE PASSWORD FOR THIS DATA SET     ( ELSE 'NONE' ).?JUNIOR
```

```
HERE IS A DESCRIPTION OF THE DATA SET.

NAME = HALD

NUMBER OF OBSERVATIONS = 7
NUMBER OF VARIABLES = 3

VARIABLE 1     = VAR-01
VARIABLE 2     = VAR-02
VARIABLE 3     = VAR-03

IF YOU WANT TO PROCEED TO AN ANALYSIS,     TYPE '1'.
IF YOU WANT TO REMAIN IN DATA MANAGEMENT, TYPE '2'.?2
```

MODEL 1. DATA ENTRY AND TRANSFERS

1. DATA ENTRY FROM THE TERMINAL
2. DATA TRANSFER FROM DISK
3. DATA TRANSFER FROM THE CATALOG

4. DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0')?0

COMPONENT 12. DATA MOVEMENT

1. DATA ENTRY AND TRANSFERS
2. DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0')?0

```
COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12.  DATA MOVEMENT      ( INPUT/OUTPUT, EDITING )
13.  DATA TRANSFORMATIONS
14.  FILE MAINTENANCE  ( DATA GROUPING )

    * NOT YET AVAILABLE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?13
```

```
     COMPONENT 13.  DATA TRANSFORMATIONS

     1.   NULLARY, UNARY, AND BINARY OPERATIONS
     2.   SUFFICIENT STATISTICS
     3.   MATRIX OPERATIONS

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' )?2
```

SUMMARY STATISTICS

1. MEANS, ST.DEV.'S, PERCENTILES, ETC.
2. VARIANCE-COVARIANCE MATRIX
3. CORRELATION MATRIX

ENTER THE NUMBER OF THE OPTION YOU WANT (EXIT=0).?1

THE SUMMARY STATISTICS ARE NOW BEING COMPUTED.

HERE ARE THE DESCRIPTIVE/SUMMARY STATISTICS FOR YOUR DATA.

DATA SET = HALD

VARIABLES

N= 7	VAR-01	VAR-02	VAR-03
MEAN	7.29	44.29	93.21
TRIMEAN**	7.00	46.50	93.65
MIDMEAN**	7.00	41.00	91.18
SMALLEST	1.00	19.00	74.30
LARGEST	11.00	71.00	109.20
25TH %ILE	3.00	26.00	78.50
50TH %ILE	7.00	52.00	95.90
75TH %ILE	11.00	56.00	104.30
90TH %ILE	11.00	71.00	109.20
ST.DEV.	3.77	17.63	12.43
VARIANCE	14.20	310.78	154.49
MIDSPREAD	10.00	52.00	34.90

** TRIMEAN, MIDMEAN DEFINED BY J.W.TUKEY E.D.A.,1977
WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

SUMMARY STATISTICS

1. MEANS, ST.DEV.'S, PERCENTILES, ETC.
2. VARIANCE-COVARIANCE MATRIX
3. CORRELATION MATRIX

ENTER THE NUMBER OF THE OPTION YOU WANT (EXIT=0).?2

THE STATISTICS ARE BEING CALCULATED...

VARIANCE-COVARIANCE MATRIX

DATA SET = HALD

	VAR-01	VAR-02	VAR-03
VAR-01	14.20	60.20	45.51
VAR-02		310.78	214.45
VAR-03			154.49

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

SUMMARY STATISTICS

1. MEANS, ST.DEV.'S, PERCENTILES, ETC.
2. VARIANCE-COVARIANCE MATRIX
3. CORRELATION MATRIX

ENTER THE NUMBER OF THE OPTION YOU WANT (EXIT=0).?0

COMPONENT 13. DATA TRANSFORMATIONS

1. NULLARY, UNARY, AND BINARY OPERATIONS
2. SUFFICIENT STATISTICS
3. MATRIX OPERATIONS

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0')?3

```
*********  MATRIX OPERATIONS AND MANAGEMENT  *********

     THIS SECTION ALLOWS THE USER TO TYPE-IN MATRICES
AND PERFORM A WIDE VARIETY OF OPERATIONS UPON THEM.
IN ADDITION, THE ABILITY TO EDIT, COPY, PARTITION, AND
LINK THESE MATRICES IS PROVIDED.

   TYPE '1' FOR DIRECT PROGRAM ENTRY
        '2' FOR A CONCISE LIST OF PROGRAM SPECIFICS
        '3' FOR A SUMMARY OF THE PROGRAM
        '4' FOR ENTRY OF PERSONAL FILE DATA

FOR THOSE NEW TO THIS SECTION OF CADA, OPTION #3 IS
SUGGESTED UNLESS YOU ARE PARTICULARLY FAMILIAR WITH
MATRIX MANIPULATIONS.  IN THIS CASE OPTION #2 MAY BE
SUFFICIENT.

TYPE THE NUMBER OF AN AVAILABLE OPTION, OR '0' TO EXIT.?4




PERSONAL FILE INFORMATION HAS BEEN RETRIEVED
THE MATRIX IS CALLED HALD AND IS 7    BY 3

                                TYPE '1' TO CONTINUE
                                     '0' TO START OVER?1
```

```
      ***************************************
******** MATRIX OPERATIONS AND MANAGEMENT ********
      ***************************************

      1. MATRIX  MANAGEMENT
      2. STANDARD MATRIX OPERATIONS
      3. SPECIAL MATRIX OPERATORS

USE '0' TO EXIT.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?1
```

```
   **** MATRIX  MANAGEMENT ****


MATRIX LIST      1: HALD

     1. MATRIX LIST AND PRINTING

     2. MATRIX ENTRY FROM TERMINAL
     3. MATRIX EDITING
     4. COPY A MATRIX
     5. RENAME A MATRIX
     6. MATRIX PARTITIONING
     7. MATRIX LINKAGE
     8. MATRIX DELETION

 *   9. DATA RETRIEVAL FROM FILE
 *  10. MATRIX PRINT TO FILE

 *   NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?2
```

```
 *** MATRIX ENTRY FROM TERMINAL ***

MATRIX DIMENSIONS ARE:   # OF ROWS  ,  # OF COLUMNS

TO TYPE IN A MATRIX, GIVE ITS DIMENSIONS; ELSE '0,0'.?1,3
```

```
TYPE-IN THE MATRIX A ROW AT A TIME.
SEPARATE THE ELEMENTS WITH COMMAS.
?7.29,44.29,93.21
```

```
IF YOU SAVE AND LABEL THIS MATRIX, YOU WILL BE GIVEN
AN OPPORTUNITY TO MAKE CORRECTIONS WITHIN THE EDITOR.
 --- RESULTANT MATRIX ---
    7.29   44.29   93.21

DO YOU WANT THIS MATRIX SAVED ?    TYPE '1' FOR YES
                                        '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE IN A
LABEL OF UP TO 6 CHARACTERS.  ANY 6-CHARACTER COMBINATION
OF LETTERS NUMBERS AND SYMBOLS IS ACCEPTABLE.  SHORTER
LABELS CAN BE USED, BUT LONGER LABELS CAN NOT BE USED.

WHEN PERFORMING A SERIES OF OPERATIONS, SYMBOLS CAN
BE USED TO LABEL SUCCESSIVE MATRICES.  FOR EXAMPLE,
ALL THE FOLLOWING ARE ACCEPTABLE NAMES.
  A  ,  B=A'A  ,  C=I-B  ,   D=A*C

YOUR LABEL?MUHAT
```

```
TYPE '2' FOR AN EXPLANATION OF THE EDITOR
     '1' TO CONTINUE TO THE EDITOR
     '0' TO EXIT
?0
```

```
**** MATRIX  MANAGEMENT ****

MATRIX LIST      1: HALD      2: MUHAT

     1. MATRIX LIST AND PRINTING

     2. MATRIX ENTRY FROM TERMINAL
     3. MATRIX EDITING
     4. COPY A MATRIX
     5. RENAME A MATRIX
     6. MATRIX PARTITIONING
     7. MATRIX LINKAGE
     8. MATRIX DELETION

  *  9. DATA RETRIEVAL FROM FILE
  * 10. MATRIX PRINT TO FILE

  *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?2
```

```
*** MATRIX ENTRY FROM TERMINAL ***

MATRIX DIMENSIONS ARE:    # OF ROWS  ,  # OF COLUMNS

TO TYPE IN A MATRIX, GIVE ITS DIMENSIONS, ELSE '0,0'.?3,3
```

```
WHAT TYPE OF MATRIX DO YOU WANT ?
   '1' FOR AN IDENTITY MATRIX
   '2' FOR A UNITY MATRIX
   '3' FOR A DIAGONAL MATRIX
   '4' FOR A GENERAL MATRIX

TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?3
```

```
TYPE IN ONE ELEMENT PER LINE.
?3.77
?17.63
?12.43
```

```
IF YOU SAVE AND LABEL THIS MATRIX, YOU WILL BE GIVEN
AN OPPORTUNITY TO MAKE CORRECTIONS WITHIN THE EDITOR.
 --- RESULTANT MATRIX ---
    3.77     0.00     0.00
    0.00    17.63     0.00
    0.00     0.00    12.43

DO YOU WANT THIS MATRIX SAVED ?    TYPE '1' FOR YES
                                        '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE IN A
LABEL OF UP TO 6 CHARACTERS.?SIGMA
```

```
TYPE '2' FOR AN EXPLANATION OF THE EDITOR
     '1' TO CONTINUE TO THE EDITOR
     '0' TO EXIT
?0
```

```
  **** MATRIX  MANAGEMENT ****

MATRIX LIST     1: HALD      2: MUHAT     3: SIGMA

    1. MATRIX LIST AND PRINTING

    2. MATRIX ENTRY FROM TERMINAL
    3. MATRIX EDITING
    4. COPY A MATRIX
    5. RENAME A MATRIX
    6. MATRIX PARTITIONING
    7. MATRIX LINKAGE
    8. MATRIX DELETION

 *  9. DATA RETRIEVAL FROM FILE
 * 10. MATRIX PRINT TO FILE

 *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?2
```

```
  *** MATRIX ENTRY FROM TERMINAL ***

MATRIX DIMENSIONS ARE:    # OF ROWS   ,   # OF COLUMNS

TO TYPE IN A MATRIX, GIVE ITS DIMFNSIONS; ELSE '0,0'.?7,1
```

```
TYPE-IN THE MATRIX A ROW AT A TIME.
SEPARATE THE ELEMENTS WITH COMMAS.
?1
?1
?1
?1
?1
?1
?1
```

```
IF YOU SAVE AND LABEL THIS MATRIX, YOU WILL BE GIVEN
AN OPPORTUNITY TO MAKE CORRECTIONS WITHIN THE EDITOR.
 --- RESULTANT MATRIX ---
     1.00
     1.00
     1.00
     1.00
     1.00
     1.00
     1.00

DO YOU WANT THIS MATRIX SAVED ?    TYPE '1' FOR YES
                                        '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE IN A
LABEL OF UP TO 6 CHARACTERS.?UNITY
```

```
TYPE '2' FOR AN EXPLANATION OF THE EDITOR
     '1' TO CONTINUE TO THE EDITOR
     '0' TO EXIT
?0
```

```
  **** MATRIX  MANAGEMENT ****

MATRIX LIST     1: HALD      2: MUHAT      3: SIGMA      4: UNITY

    1. MATRIX LIST AND PRINTING

    2. MATRIX ENTRY FROM TERMINAL
    3. MATRIX EDITING
    4. COPY A MATRIX
    5. RENAME A MATRIX
    6. MATRIX PARTITIONING
    7. MATRIX LINKAGE
    8. MATRIX DELETION

 *  9. DATA RETRIEVAL FROM FILE
 * 10. MATRIX PRINT TO FILE

 *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?0
```

```
     *******************************************
******** MATRIX OPERATIONS AND MANAGEMENT ********
     *******************************************

     1. MATRIX  MANAGEMENT
     2. STANDARD MATRIX OPERATIONS
     3. SPECIAL MATRIX OPERATORS

USE '0' TO EXIT.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?2
```

```
   **** STANDARD MATRIX OPERATIONS ****

MATRIX LIST     1: HALD      2: MUHAT     3: SIGMA     4: UNITY

     1. MATRIX LIST AND PRINTING

     2. ADDITION (OF TWO MATRICES)
     3. SUBTRACTION (OF TWO MATRICES)
     4. MATRIX MULTIPLICATION
     5. TRANSPOSITION
     6. X'X
     7. INVERSE
     8. DETERMINANT

 MATRIX/SCALAR OPERATIONS
     9. ADDITION
    10. SUBTRACTION
    11. MULTIPLICATION
    12. DIVISION

USE '0' TO ACCESS OTHER SECTIONS.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?4
```

```
COMPUTATION:  THE PRODUCT OF TWO MATRICES.

   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

          MATRIX #       LABEL         DIMENSION
   ----------------------------------------------
                1 - - - HALD             7  X  3
                2 - - - MUHAT            1  X  3
                3 - - - SIGMA            3  X  3
                4 - - - UNITY            7  X  1

TYPE TWO AVAILABLE NUMBERS SEPARATED BY A COMMA.
THE OPERATION WILL BE PERFORMED IN THE ORDER THAT
THE MATRICES ARE ENTERED.    ENTER '0,0' TO EXIT.?4,2
```

```
BEFORE MULTIPLYING THEM...
DO YOU WANT THESE MATRICES PRINTED OUT ?

TYPE '0'  FOR NO
     '1'  FOR THE FIRST MATRIX ONLY
     '2'  FOR THE SECOND MATRIX ONLY
     '3'  FOR BOTH MATRICES
?3
```

```
MATRIX  #  4       UNITY

     1.00
     1.00
     1.00
     1.00
     1.00
     1.00
     1.00


MATRIX  #  2       MUHAT

     7.29    44.29    93.21

                   TYPE '1' TO CONTINUE?1




 --- RESULT ---   MATRIX  #  5

     7.29    44.29    93.21
     7.29    44.29    93.21
     7.29    44.29    93.21
     7.29    44.29    93.21
     7.29    44.29    93.21
     7.29    44.29    93.21
     7.29    44.29    93.21

DO YOU WANT THIS MATRIX SAVED ?    TYPE '1' FOR YES
                                        '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE A
LABEL OF UP TO 6 CHARACTERS.?MEAN
```

```
   **** STANDARD MATRIX OPERATIONS ****

MATRIX LIST      1: HALD      2: MUHAT      3: SIGMA      4: UNITY      5: MEAN

      1. MATRIX LIST AND PRINTING

      2. ADDITION (OF TWO MATRICES)
      3. SUBTRACTION (OF TWO MATRICES)
      4. MATRIX MULTIPLICATION
      5. TRANSPOSITION
      6. X'X
      7. INVERSE
      8. DETERMINANT

 MATRIX/SCALAR OPERATIONS
      9. ADDITION
     10. SUBTRACTION
     11. MULTIPLICATION
     12. DIVISION

USE '0' TO ACCESS OTHER SECTIONS.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?3


COMPUTATION:  THE DIFFERENCE OF TWO MATRICES.

   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

         MATRIX #      LABEL         DIMENSION
   ----------------------------------------------
                1 - - - HALD           7  X  3
                2 - - - MUHAT          1  X  3
                3 - - - SIGMA          3  X  3
                4 - - - UNITY          7  X  1
                5 - - - MEAN           7  X  3

TYPE TWO AVAILABLE NUMBERS SEPARATED BY A COMMA.
THE OPERATION WILL BE PERFORMED IN THE ORDER THAT
THE MATRICES ARE ENTERED.    ENTER '0,0' TO EXIT.?1,5
```

```
BEFORE SUBTRACTING THEM...
DO YOU WANT THESE MATRICES PRINTED OUT ?

TYPE '0'  FOR NO
     '1'  FOR THE FIRST MATRIX ONLY
     '2'  FOR THE SECOND MATRIX ONLY
     '3'  FOR BOTH MATRICES
?3
```

```
MATRIX  #  1        HALD

    7.00   26.00   78.50
    1.00   19.00   74.30
   11.00   56.00  104.30
   11.00   31.00   87.60
    7.00   52.00   95.90
   11.00   55.00  109.20
    3.00   71.00  102.70


MATRIX  #  5        MEAN

    7.29   44.29   93.21
    7.29   44.29   93.21
    7.29   44.29   93.21
    7.29   44.29   93.21
    7.29   44.29   93.21
    7.29   44.29   93.21
    7.29   44.29   93.21

               TYPE '1' TO CONTINUE?1
```

```
--- RESULT ---   MATRIX  #  6

   -0.29   -18.29   -14.71
   -6.29   -25.29   -18.91
    3.71    11.71    11.09
    3.71   -13.29    -5.61
   -0.29     7.71     2.69
    3.71    10.71    15.99
   -4.29    26.71     9.49

DO YOU WANT THIS MATRIX SAVED ?     TYPE '1' FOR YES
                                         '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE A
LABEL OF UP TO 6 CHARACTERS.?XYCNTR




    **** STANDARD MATRIX OPERATIONS ****

MATRIX LIST      1: HALD       2: MUHAT      3: SIGMA      4: UNITY      5: MEAN
                 6: XYCNTR

      1. MATRIX LIST AND PRINTING

      2. ADDITION (OF TWO MATRICES)
      3. SUBTRACTION (OF TWO MATRICES)
      4. MATRIX MULTIPLICATION
      5. TRANSPOSITION
      6. X'X
      7. INVERSE
      8. DETERMINANT

 MATRIX/SCALAR OPERATIONS
      9. ADDITION
     10. SUBTRACTION
     11. MULTIPLICATION
     12. DIVISION

USE '0' TO ACCESS OTHER SECTIONS.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?7
```

COMPUTATION: INVERSE OF A MATRIX.

THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

MATRIX #	LABEL	DIMENSION
1 - - -	HALD	7 X 3
2 - - -	MUHAT	1 X 3
3 - - -	SIGMA	3 X 3
4 - - -	UNITY	7 X 1
5 - - -	MEAN	7 X 3
6 - - -	XYCNTR	7 X 3

WHICH MATRIX DO YOU WANT TO INVERT ?
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?3

MATRIX # 3 SIGMA

3.77	0.00	0.00
0.00	17.63	0.00
0.00	0.00	12.43

TYPE '1' TO CONTINUE?1

```
 --- RESULT ---   MATRIX  #  7

    0.27    0.00    0.00
    0.00    0.06    0.00
    0.00    0.00    0.08

DO YOU WANT THIS MATRIX SAVED ?    TYPE '1' FOR YES
                                        '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE A
LABEL OF UP TO 6 CHARACTERS.?SIGINV
```

```
   **** STANDARD MATRIX OPERATIONS ****

MATRIX LIST      1: HALD      2: MUHAT      3: SIGMA      4: UNITY      5: MEAN
                 6: XYCNTR    7: SIGINV

      1. MATRIX LIST AND PRINTING

      2. ADDITION (OF TWO MATRICES)
      3. SUBTRACTION (OF TWO MATRICES)
      4. MATRIX MULTIPLICATION
      5. TRANSPOSITION
      6. X'X
      7. INVERSE
      8. DETERMINANT

 MATRIX/SCALAR OPERATIONS
      9. ADDITION
     10. SUBTRACTION
     11. MULTIPLICATION
     12. DIVISION

USE '0' TO ACCESS OTHER SECTIONS.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?4
```

6

```
COMPUTATION: THE PRODUCT OF TWO MATRICES.

   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

         MATRIX #      LABEL          DIMENSION
   ---------------------------------------------
              1 - - - HALD            7  X  3
              2 - - - MUHAT           1  X  3
              3 - - - SIGMA           3  X  3
              4 - - - UNITY           7  X  1
              5 - - - MEAN            7  X  3
              6 - - - XYCNTR          7  X  3
              7 - - - SIGINV          3  X  3

TYPE TWO AVAILABLE NUMBERS SEPARATED BY A COMMA.
THE OPERATION WILL BE PERFORMED IN THE ORDER THAT
THE MATRICES ARE ENTERED.    ENTER '0,0' TO EXIT.?6,7
```

```
BEFORE MULTIPLYING THEM...
DO YOU WANT THESE MATRICES PRINTED OUT ?

TYPE '0'  FOR NO
     '1'  FOR THE FIRST MATRIX ONLY
     '2'  FOR THE SECOND MATRIX ONLY
     '3'  FOR BOTH MATRICES
?3
```

```
MATRIX  #  6        XYCNTR

    -0.29  -18.29  -14.71
    -6.29  -25.29  -18.91
     3.71   11.71   11.09
     3.71  -13.29   -5.61
    -0.29    7.71    2.69
     3.71   10.71   15.99
    -4.29   26.71    9.49


MATRIX  #  7        SIGINV

     0.27    0.00    0.00
     0.00    0.06    0.00
     0.00    0.00    0.08

                      TYPE '1' TO CONTINUE?1
```

```
 --- RESULT ---   MATRIX  #  8

    -0.08   -1.04   -1.18
    -1.67   -1.43   -1.52
     0.98    0.66    0.89
     0.98   -0.75   -0.45
    -0.08    0.44    0.22
     0.98    0.61    1.29
    -1.14    1.52    0.76

DO YOU WANT THIS MATRIX SAVED ?    TYPE '1' FOR YES
                                        '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE A
LABEL OF UP TO 6 CHARACTERS.?XYSTD
```

```
    **** STANDARD MATRIX OPERATIONS ****

MATRIX LIST     1: HALD      2: MUHAT     3: SIGMA     4: UNITY     5: MEAN
                6: XYCNTR    7: SIGINV    8: XYSTD

       1. MATRIX LIST AND PRINTING

       2. ADDITION (OF TWO MATRICES)
       3. SUBTRACTION (OF TWO MATRICES)
       4. MATRIX MULTIPLICATION
       5. TRANSPOSITION
       6. X'X
       7. INVERSE
       8. DETERMINANT

 MATRIX/SCALAR OPERATIONS
       9. ADDITION
      10. SUBTRACTION
      11. MULTIPLICATION
      12. DIVISION

USE '0' TO ACCESS OTHER SECTIONS.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?0
```

```
     ****************************************
******** MATRIX OPERATIONS AND MANAGEMENT ********
     ****************************************

     1. MATRIX  MANAGEMENT
     2. STANDARD MATRIX OPERATIONS
     3. SPECIAL MATRIX OPERATORS

USE '0' TO EXIT.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?1
```

```
**** MATRIX  MANAGEMENT ****

MATRIX LIST      1: HALD       2: MUHAT      3: SIGMA      4: UNITY      5: MEAN
                 6: XYCNTR     7: SIGINV     8: XYSTD

    1. MATRIX LIST AND PRINTING

    2. MATRIX ENTRY FROM TERMINAL
    3. MATRIX EDITING
    4. COPY A MATRIX
    5. RENAME A MATRIX
    6. MATRIX PARTITIONING
    7. MATRIX LINKAGE
    8. MATRIX DELETION

 *  9. DATA RETRIEVAL FROM FILE
 * 10. MATRIX PRINT TO FILE

 *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?6
```

```
 *** MATRIX PARTITIONING ***     THE FORMATION OF A NEW
MATRIX BY EXCLUDING ROWS AND/OR COLUMNS OF ANOTHER MATRIX.

   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

         MATRIX #      LABEL         DIMENSION
   ----------------------------------------------
              1 - - - HALD          7  X  3
              2 - - - MUHAT         1  X  3
              3 - - - SIGMA         3  X  3
              4 - - - UNITY         7  X  1
              5 - - - MEAN          7  X  3
              6 - - - XYCNTR        7  X  3
              7 - - - SIGINV        3  X  3
              8 - - - XYSTD         7  X  3

WHICH MATRIX DO YOU WISH TO PARTITION ?
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?8
```

MATRIX # 8 XYSTD

-0.08	-1.04	-1.18
-1.67	-1.43	-1.52
0.98	0.66	0.89
0.98	-0.75	-0.45
-0.08	0.44	0.22
0.98	0.61	1.29
-1.14	1.52	0.76

```
  TYPE '0' TO EXIT,   '1' TO CONTINUE.?1
TYPE-IN THE FIRST COLUMN YOU WISH TO EXCLUDE.
IF NONE ARE TO BE EXCLUDED TYPE '0'.?3
NEXT COLUMN TO BE EXCLUDED ?   ELSE '0' ?0
```

MATRIX # 9

-0.08	-1.04
-1.67	-1.43
0.98	0.66
0.98	-0.75
-0.08	0.44
0.98	0.61
-1.14	1.52

```
TYPE-IN THE FIRST ROW THAT YOU WISH TO EXCLUDE.
IF NO ROWS ARE TO BE EXCLUDED,  TYPE '0' ?0
```

```
--- RESULTANT MATRIX ---
   -0.08    -1.04
   -1.67    -1.43
    0.98     0.66
    0.98    -0.75
   -0.08     0.44
    0.98     0.61
   -1.14     1.52

DO YOU WANT THIS MATRIX SAVED ?     TYPE '1' FOR YES
                                         '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE IN A
LABEL OF UP TO 6 CHARACTERS.?XSTD
```

```
  **** MATRIX  MANAGEMENT ****

MATRIX LIST       1: HALD        2: MUHAT       3: SIGMA       4: UNITY       5: MEAN
                  6: XYCNTR      7: SIGINV      8: XYSTD       9: XSTD

    1. MATRIX LIST AND PRINTING

    2. MATRIX ENTRY FROM TERMINAL
    3. MATRIX EDITING
    4. COPY A MATRIX
    5. RENAME A MATRIX
    6. MATRIX PARTITIONING
    7. MATRIX LINKAGE
    8. MATRIX DELETION

 *  9. DATA RETRIEVAL FROM FILE
 * 10. MATRIX PRINT TO FILE

 *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?6
```

```
*** MATRIX PARTITIONING ***      THE FORMATION OF A NEW
MATRIX BY EXCLUDING ROWS AND/OR COLUMNS OF ANOTHER MATRIX.

   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

        MATRIX #      LABEL          DIMENSION
   ----------------------------------------------
             1 - - - HALD              7  X  3
             2 - - - MUHAT             1  X  3
             3 - - - SIGMA             3  X  3
             4 - - - UNITY             7  X  1
             5 - - - MEAN              7  X  3
             6 - - - XYCNTR            7  X  3
             7 - - - SIGINV            3  X  3
             8 - - - XYSTD             7  X  3
             9 - - - XSTD              7  X  2

WHICH MATRIX DO YOU WISH TO PARTITION ?
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?8




MATRIX  #  8       XYSTD

   -0.08    -1.04    -1.18
   -1.67    -1.43    -1.52
    0.98     0.66     0.89
    0.98    -0.75    -0.45
   -0.08     0.44     0.22
    0.98     0.61     1.29
   -1.14     1.52     0.76

  TYPE '0' TO EXIT,   '1' TO CONTINUE.?1
TYPE-IN THE FIRST COLUMN YOU WISH TO EXCLUDE.
IF NONE ARE TO BE EXCLUDED TYPE '0'.?1
NEXT COLUMN TO BE EXCLUDED ?   ELSE '0' ?2
NEXT COLUMN TO BE EXCLUDED ?   ELSE '0' ?0
```

```
MATRIX # 10

  -1.18
  -1.52
   0.89
  -0.45
   0.22
   1.29
   0.76

TYPE-IN THE FIRST ROW THAT YOU WISH TO EXCLUDE.
IF NO ROWS ARE TO BE EXCLUDED,  TYPE '0' ?0
```

```
 --- RESULTANT MATRIX ---
  -1.18
  -1.52
   0.89
  -0.45
   0.22
   1.29
   0.76

DO YOU WANT THIS MATRIX SAVED ?    TYPE '1' FOR YES
                                        '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE IN A
LABEL OF UP TO 6 CHARACTERS.?Y
```

```
   **** MATRIX  MANAGEMENT ****

MATRIX LIST      1: HALD      2: MUHAT      3: SIGMA      4: UNITY      5: MEAN
                 6: XYCNTR    7: SIGINV     8: XYSTD      9: XSTD      10: Y

     1. MATRIX LIST AND PRINTING

     2. MATRIX ENTRY FROM TERMINAL
     3. MATRIX EDITING
     4. COPY A MATRIX
     5. RENAME A MATRIX
     6. MATRIX PARTITIONING
     7. MATRIX LINKAGE
     8. MATRIX DELETION

  *  9. DATA RETRIEVAL FROM FILE
  * 10. MATRIX PRINT TO FILE

  *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?7




   *** 2-MATRIX LINKAGE ***   TO LINK TWO MATRICES
HORIZOLTALLY, THEY MUST HAVE THE SAME NUMBER OF ROWS.
TO LINK VERTICALLY, THE NUMBER OF COLUMNS MUST MATCH.

   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

         MATRIX #     LABEL        DIMENSION
   ---------------------------------------------
             1 - - - HALD           7  X  3
             2 - - - MUHAT          1  X  3
             3 - - - SIGMA          3  X  3
             4 - - - UNITY          7  X  1
             5 - - - MEAN           7  X  3
             6 - - - XYCNTR         7  X  3
             7 - - - SIGINV         3  X  3
             8 - - - XYSTD          7  X  3
             9 - - - XSTD           7  X  2
            10 - - - Y              7  X  1

WHICH TYPE OF LINKAGE DO YOU WISH TO PERFORM ?
  '1'- HORIZONTAL   '2'- VERTICAL    '0' TO EXIT?1

TYPE-IN THE NUMBER OF THE MATRIX YOU WANT ON
THE LEFT, THEN THE MATRIX YOU WANT ON THE RIGHT,
```

```
SEPARATING THEM WITH A COMMA.  ENTER '0,0' TO EXIT?4,9
```

```
BEFORE LINKING THEM...
DO YOU WANT THESE MATRICES PRINTED OUT ?

TYPE '0'  FOR NO
     '1'  FOR THE FIRST MATRIX ONLY
     '2'  FOR THE SECOND MATRIX ONLY
     '3'  FOR BOTH MATRICES
?3
```

```
MATRIX  #  4        UNITY

     1.00
     1.00
     1.00
     1.00
     1.00
     1.00
     1.00


MATRIX  #  9        XSTD

    -0.08    -1.04
    -1.67    -1.43
     0.98     0.66
     0.98    -0.75
    -0.08     0.44
     0.98     0.61
    -1.14     1.52

                         TYPE '1' TO CONTINUE?1


 --- RESULTANT MATRIX ---
     1.00    -0.08    -1.04
     1.00    -1.67    -1.43
     1.00     0.98     0.66
     1.00     0.98    -0.75
     1.00    -0.08     0.44
     1.00     0.98     0.61
     1.00    -1.14     1.52

   ***  WARNING  ***    THIS IS YOUR ELEVENTH MATRIX.
IF THIS MATRIX IS SAVED, ANOTHER MATRIX WILL HAVE TO
BE DELETED.
DO YOU WANT THIS MATRIX SAVED ?    TYPE '1' FOR YES
                                        '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE IN A
LABEL OF UP TO 6 CHARACTERS.?X
```

```
THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

      MATRIX #       LABEL          DIMENSION
----------------------------------------------------
            1 - - - HALD            7  X  3
            2 - - - MUHAT           1  X  3
            3 - - - SIGMA           3  X  3
            4 - - - UNITY           7  X  1
            5 - - - MEAN            7  X  3
            6 - - - XYCNTR          7  X  3
            7 - - - SIGINV          3  X  3
            8 - - - XYSTD           7  X  3
            9 - - - XSTD            7  X  2
           10 - - - Y               7  X  1
           11 - - - X               7  X  3

WHICH MATRIX DO YOU WANT DELETED?9
```

```
MATRIX  # 9        XSTD

   -0.08   -1.04
   -1.67   -1.43
    0.98    0.66
    0.98   -0.75
   -0.08    0.44
    0.98    0.61
   -1.14    1.52

TYPE '0' TO PREVENT DELETION   '1' TO DELETE?1
```

```
 **** MATRIX  MANAGEMENT ****

MATRIX LIST      1: HALD       2: MUHAT      3: SIGMA    . 4: UNITY      5: MEAN
                 6: XYCNTR     7: SIGINV     8: XYSTD      9: Y         10: X

     1. MATRIX LIST AND PRINTING

     2. MATRIX ENTRY FROM TERMINAL
     3. MATRIX EDITING
     4. COPY A MATRIX
     5. RENAME A MATRIX
     6. MATRIX PARTITIONING
     7. MATRIX LINKAGE
     8. MATRIX DELETION

  *  9. DATA RETRIEVAL FROM FILE
  * 10. MATRIX PRINT TO FILE

  *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?8




 --- MATRIX DELETION ---    BEFORE THE DELETION IS FINAL,
THE MATRIX IS PRINTED AND DELETION CAN BE PREVENTED.


   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

         MATRIX #      LABEL         DIMENSION
   ---------------------------------------------
                1 - - - HALD          7  X  3
                2 - - - MUHAT         1  X  3
                3 - - - SIGMA         3  X  3
                4 - - - UNITY         7  X  1
                5 - - - MEAN          7  X  3
                6 - - - XYCNTR        7  X  3
                7 - - - SIGINV        3  X  3
                8 - - - XYSTD         7  X  3
                9 - - - Y             7  X  1
               10 - - - X             7  X  3

WHICH MATRIX DO YOU WANT TO DELETE ?
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?8
```

```
MATRIX  #  8        XYSTD

   -0.08   -1.04   -1.18
   -1.67   -1.43   -1.52
    0.98    0.66    0.89
    0.98   -0.75   -0.45
   -0.08    0.44    0.22
    0.98    0.61    1.29
   -1.14    1.52    0.76

TYPE '0' TO PREVENT DELETION   '1' TO DELETE?1
```

```
 **** MATRIX  MANAGEMENT ****

MATRIX LIST      1: HALD      2: MUHAT     3: SIGMA     4: UNITY     5: MEAN
                 6: XYCNTR    7: SIGINV    8: Y         9: X

    1. MATRIX LIST AND PRINTING

    2. MATRIX ENTRY FROM TERMINAL
    3. MATRIX EDITING
    4. COPY A MATRIX
    5. RENAME A MATRIX
    6. MATRIX PARTITIONING
    7. MATRIX LINKAGE
    8. MATRIX DELETION

 *  9. DATA RETRIEVAL FROM FILE
 * 10. MATRIX PRINT TO FILE

 *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?8
```

```
--- MATRIX DELETION ---   BEFORE THE DELETION IS FINAL,
THE MATRIX IS PRINTED AND DELETION CAN BE PREVENTED.

   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

         MATRIX #      LABEL          DIMENSION
   ---------------------------------------------------
              1 - - - HALD              7  X  3
              2 - - - MUHAT             1  X  3
              3 - - - SIGMA             3  X  3
              4 - - - UNITY             7  X  1
              5 - - - MEAN              7  X  3
              6 - - - XYCNTR            7  X  3
              7 - - - SIGINV            3  X  3
              8 - - - Y                 7  X  1
              9 - - - X                 7  X  3

WHICH MATRIX DO YOU WANT TO DELETE ?
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?7




MATRIX  #  7        SIGINV

    0.27    0.00    0.00
    0.00    0.06    0.00
    0.00    0.00    0.08

TYPE '0' TO PREVENT DELETION   '1' TO DELETE?1
```

```
**** MATRIX  MANAGEMENT ****

MATRIX LIST      1: HALD       2: MUHAT      3: SIGMA      4: UNITY      5: MEAN
                 6: XYCNTR     7: Y          8: X

     1. MATRIX LIST AND PRINTING

     2. MATRIX ENTRY FROM TERMINAL
     3. MATRIX EDITING
     4. COPY A MATRIX
     5. RENAME A MATRIX
     6. MATRIX PARTITIONING
     7. MATRIX LINKAGE
     8. MATRIX DELETION

  *  9. DATA RETRIEVAL FROM FILE
  * 10. MATRIX PRINT TO FILE

  *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?8




 --- MATRIX DELETION ---    BEFORE THE DELETION IS FINAL,
THE MATRIX IS PRINTED AND DELETION CAN BE PREVENTED.

   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

         MATRIX #      LABEL          DIMENSION
   ---------------------------------------------
              1 - - - HALD             7  X  3
              2 - - - MUHAT            1  X  3
              3 - - - SIGMA            3  X  3
              4 - - - UNITY            7  X  1
              5 - - - MEAN             7  X  3
              6 - - - XYCNTR           7  X  3
              7 - - - Y                7  X  1
              8 - - - X                7  X  3

WHICH MATRIX DO YOU WANT TO DELETE ?
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?6
```

```
MATRIX  #  6       XYCNTR

   -0.29  -18.29  -14.71
   -6.29  -25.29  -18.91
    3.71   11.71   11.09
    3.71  -13.29   -5.61
   -0.29    7.71    2.69
    3.71   10.71   15.99
   -4.29   26.71    9.49

TYPE '0' TO PREVENT DELETION   '1' TO DELETE?1
```

```
  **** MATRIX  MANAGEMENT ****


MATRIX LIST      1: HALD       2: MUHAT      3: SIGMA      4: UNITY      5: MEAN
                 6: Y          7: X

    1. MATRIX LIST AND PRINTING

    2. MATRIX ENTRY FROM TERMINAL
    3. MATRIX EDITING
    4. COPY A MATRIX
    5. RENAME A MATRIX
    6. MATRIX PARTITIONING
    7. MATRIX LINKAGE
    8. MATRIX DELETION

 *  9. DATA RETRIEVAL FROM FILE
 * 10. MATRIX PRINT TO FILE

 *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?8
```

```
--- MATRIX DELETION ---   BEFORE THE DELETION IS FINAL,
THE MATRIX IS PRINTED AND DELETION CAN BE PREVENTED.


   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

         MATRIX #     LABEL        DIMENSION
   ----------------------------------------------
              1 - - - HALD          7  X  3
              2 - - - MUHAT         1  X  3
              3 - - - SIGMA         3  X  3
              4 - - - UNITY         7  X  1
              5 - - - MEAN          7  X  3
              6 - - - Y             7  X  1
              7 - - - X             7  X  3

WHICH MATRIX DO YOU WANT TO DELETE ?
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?5
```

```
MATRIX  #  5       MEAN

    7.29   44.29   93.21
    7.29   44.29   93.21
    7.29   44.29   93.21
    7.29   44.29   93.21
    7.29   44.29   93.21
    7.29   44.29   93.21
    7.29   44.29   93.21

TYPE '0' TO PREVENT DELETION   '1' TO DELETE?1
```

```
  **** MATRIX  MANAGEMENT ****

MATRIX LIST      1: HALD       2: MUHAT      3: SIGMA      4: UNITY      5: Y
                 6: X

     1. MATRIX LIST AND PRINTING

     2. MATRIX ENTRY FROM TERMINAL
     3. MATRIX EDITING
     4. COPY A MATRIX
     5. RENAME A MATRIX
     6. MATRIX PARTITIONING
     7. MATRIX LINKAGE
     8. MATRIX DELETION

  *  9. DATA RETRIEVAL FROM FILE
  * 10. MATRIX PRINT TO FILE

  *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?8
```

```
  --- MATRIX DELETION ---   BEFORE THE DELETION IS FINAL,
THE MATRIX IS PRINTED AND DELETION CAN BE PREVENTED.


   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

         MATRIX #     LABEL         DIMENSION
   ----------------------------------------------
                1 - - - HALD          7  X  3
                2 - - - MUHAT         1  X  3
                3 - - - SIGMA         3  X  3
                4 - - - UNITY         7  X  1
                5 - - - Y             7  X  1
                6 - - - X             7  X  3

WHICH MATRIX DO YOU WANT TO DELETE ?
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?4
```

```
MATRIX  #  4        UNITY

    1.00
    1.00
    1.00
    1.00
    1.00
    1.00
    1.00

TYPE '0' TO PREVENT DELETION   '1' TO DELETE?1
```

```
  **** MATRIX  MANAGEMENT ****

MATRIX LIST     1: HALD      2: MUHAT     3: SIGMA     4: Y         5: X

    1. MATRIX LIST AND PRINTING

    2. MATRIX ENTRY FROM TERMINAL
    3. MATRIX EDITING
    4. COPY A MATRIX
    5. RENAME A MATRIX
    6. MATRIX PARTITIONING
    7. MATRIX LINKAGE
    8. MATRIX DELETION

 *  9. DATA RETRIEVAL FROM FILE
 * 10. MATRIX PRINT TO FILE

 *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?8
```

```
 --- MATRIX DELETION ---    BEFORE THE DELETION IS FINAL,
THE MATRIX IS PRINTED AND DELETION CAN BE PREVENTED.


   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

         MATRIX #     LABEL        DIMENSION
   ----------------------------------------------
              1 - - - HALD          7  X  3
              2 - - - MUHAT         1  X  3
              3 - - - SIGMA         3  X  3
              4 - - - Y             7  X  1
              5 - - - X             7  X  3

WHICH MATRIX DO YOU WANT TO DELETE ?
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?3
```

```
MATRIX  #  3       SIGMA

    3.77    0.00    0.00
    0.00   17.63    0.00
    0.00    0.00   12.43

TYPE '0' TO PREVENT DELETION   '1' TO DELETE?1
```

```
  **** MATRIX  MANAGEMENT ****

MATRIX LIST      1: HALD       2: MUHAT      3: Y           4: X

    1. MATRIX LIST AND PRINTING

    2. MATRIX ENTRY FROM TERMINAL
    3. MATRIX EDITING
    4. COPY A MATRIX
    5. RENAME A MATRIX
    6. MATRIX PARTITIONING
    7. MATRIX LINKAGE
    8. MATRIX DELETION

 *  9. DATA RETRIEVAL FROM FILE
 * 10. MATRIX PRINT TO FILE

 *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?8
```

```
 --- MATRIX DELETION ---    BEFORE THE DELETION IS FINAL,
THE MATRIX IS PRINTED AND DELETION CAN BE PREVENTED.


   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

      MATRIX #     LABEL        DIMENSION
   ----------------------------------------------
           1 - - - HALD          7  X  3
           2 - - - MUHAT         1  X  3
           3 - - - Y             7  X  1
           4 - - - X             7  X  3

WHICH MATRIX DO YOU WANT TO DELETE ?
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?2
```

```
MATRIX  #  2        MUHAT

    7.29   44.29   93.21

TYPE '0' TO PREVENT DELETION   '1' TO DELETE?1
```

```
  **** MATRIX  MANAGEMENT ****

MATRIX LIST      1: HALD      2: Y          3: X

    1. MATRIX LIST AND PRINTING

    2. MATRIX ENTRY FROM TERMINAL
    3. MATRIX EDITING
    4. COPY A MATRIX
    5. RENAME A MATRIX
    6. MATRIX PARTITIONING
    7. MATRIX LINKAGE
    8. MATRIX DELETION

 *  9. DATA RETRIEVAL FROM FILE
 * 10. MATRIX PRINT TO FILE

 *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?8
```

--- MATRIX DELETION --- BEFORE THE DELETION IS FINAL, THE MATRIX IS PRINTED AND DELETION CAN BE PREVENTED.

THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

MATRIX #	LABEL	DIMENSION
1 - - -	HALD	7 X 3
2 - - -	Y	7 X 1
3 - - -	X	7 X 3

WHICH MATRIX DO YOU WANT TO DELETE ?
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?1

MATRIX # 1 HALD

7.00	26.00	78.50
1.00	19.00	74.30
11.00	56.00	104.30
11.00	31.00	87.60
7.00	52.00	95.90
11.00	55.00	109.20
3.00	71.00	102.70

TYPE '0' TO PREVENT DELETION '1' TO DELETE?1

```
**** MATRIX  MANAGEMENT ****

MATRIX LIST      1: Y          2: X

    1. MATRIX LIST AND PRINTING

    2. MATRIX ENTRY FROM TERMINAL
    3. MATRIX EDITING
    4. COPY A MATRIX
    5. RENAME A MATRIX
    6. MATRIX PARTITIONING
    7. MATRIX LINKAGE
    8. MATRIX DELETION

 *  9. DATA RETRIEVAL FROM FILE
 * 10. MATRIX PRINT TO FILE

 *  NOT YET AVAILABLE

USE '0' TO ACCESS OTHER SECTIONS.
TYPE IN THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?0
```

```
     ****************************************
******** MATRIX OPERATIONS AND MANAGEMENT ********
     ****************************************

     1. MATRIX  MANAGEMENT
     2. STANDARD MATRIX OPERATIONS
     3. SPECIAL MATRIX OPERATORS

USE '0' TO EXIT.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?2
```

```
**** STANDARD MATRIX OPERATIONS ****

MATRIX LIST      1: Y          2: X

      1. MATRIX LIST AND PRINTING

      2. ADDITION (OF TWO MATRICES)
      3. SUBTRACTION (OF TWO MATRICES)
      4. MATRIX MULTIPLICATION
      5. TRANSPOSITION
      6. X'X
      7. INVERSE
      8. DETERMINANT

 MATRIX/SCALAR OPERATIONS
      9. ADDITION
     10. SUBTRACTION
     11. MULTIPLICATION
     12. DIVISION

USE '0' TO ACCESS OTHER SECTIONS.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?5
```

```
COMPUTATION:  TRANSPOSE OF A MATRIX.

   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

         MATRIX #      LABEL         DIMENSION
   ----------------------------------------------
              1 - - - Y               7  X  1
              2 - - - X               7  X  3

WHICH MATRIX DO YOU WANT TO TRANSPOSE ?
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?2
```

```
MATRIX  #  2          X

     1.00    -0.08    -1.04
     1.00    -1.67    -1.43
     1.00     0.98     0.66
     1.00     0.98    -0.75
     1.00    -0.08     0.44
     1.00     0.98     0.61
     1.00    -1.14     1.52

                      TYPE '1' TO CONTINUE?1
```

```
 --- RESULT ---  MATRIX  #  3

     1.00     1.00     1.00     1.00     1.00     1.00     1.00
    -0.08    -1.67     0.98     0.98    -0.08     0.98    -1.14
    -1.04    -1.43     0.66    -0.75     0.44     0.61     1.52

DO YOU WANT THIS MATRIX SAVED ?    TYPE '1' FOR YES
                                        '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE A
LABEL OF UP TO 6 CHARACTERS.?X'
```

```
   **** STANDARD MATRIX OPERATIONS ****

MATRIX LIST      1: Y          2: X          3: X'

         1. MATRIX LIST AND PRINTING

         2. ADDITION (OF TWO MATRICES)
         3. SUBTRACTION (OF TWO MATRICES)
         4. MATRIX MULTIPLICATION
         5. TRANSPOSITION
         6. X'X
         7. INVERSE
         8. DETERMINANT

 MATRIX/SCALAR OPERATIONS
         9. ADDITION
        10. SUBTRACTION
        11. MULTIPLICATION
        12. DIVISION

USE '0' TO ACCESS OTHER SECTIONS.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?6
```

```
COMPUTATION:  X'X

   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

         MATRIX #     LABEL         DIMENSION
   ----------------------------------------------
               1 - - - Y             7  X  1
               2 - - - X             7  X  3
               3 - - - X'            3  X  7

FOR WHICH MATRIX DO YOU WANT TO FIND X'X ?
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?2
```

MATRIX # 2 X

1.00	-0.08	-1.04
1.00	-1.67	-1.43
1.00	0.98	0.66
1.00	0.98	-0.75
1.00	-0.08	0.44
1.00	0.98	0.61
1.00	-1.14	1.52

TYPE '1' TO CONTINUE?1

--- RESULT --- MATRIX # 4

7.00	-0.01	-0.00
-0.01	7.00	1.23
-0.00	1.23	7.00

DO YOU WANT THIS MATRIX SAVED ? TYPE '1' FOR YES
'0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE A
LABEL OF UP TO 6 CHARACTERS.?X'X

```
**** STANDARD MATRIX OPERATIONS ****

MATRIX LIST     1: Y          2: X          3: X'          4: X'X

      1. MATRIX LIST AND PRINTING

      2. ADDITION (OF TWO MATRICES)
      3. SUBTRACTION (OF TWO MATRICES)
      4. MATRIX MULTIPLICATION
      5. TRANSPOSITION
      6. X'X
      7. INVERSE
      8. DETERMINANT

 MATRIX/SCALAR OPERATIONS
      9. ADDITION
     10. SUBTRACTION
     11. MULTIPLICATION
     12. DIVISION

USE '0' TO ACCESS OTHER SECTIONS.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?7
```

```
COMPUTATION:  INVERSE OF A MATRIX.

   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

        MATRIX #      LABEL        DIMENSION
   ---------------------------------------------
              1 - - - Y              7  X  1
              2 - - - X              7  X  3
              3 - - - X'             3  X  7
              4 - - - X'X            3  X  3

WHICH MATRIX DO YOU WANT TO INVERT ?
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?4
```

```
MATRIX  #  4        X'X

    7.00   -0.01   -0.00
   -0.01    7.00    1.23
   -0.00    1.23    7.00

                    TYPE '1' TO CONTINUE?1
```

```
 --- RESULT ---  MATRIX  #  5

    0.14    0.00    0.00
    0.00    0.15   -0.03
    0.00   -0.03    0.15

DO YOU WANT THIS MATRIX SAVED ?    TYPE '1' FOR YES
                                        '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE A
LABEL OF UP TO 6 CHARACTERS.?X'XINV
```

```
   **** STANDARD MATRIX OPERATIONS ****

MATRIX LIST      1: Y           2: X           3: X'          4: X'X          5: X'XINV

      1. MATRIX LIST AND PRINTING

      2. ADDITION (OF TWO MATRICES)
      3. SUBTRACTION (OF TWO MATRICES)
      4. MATRIX MULTIPLICATION
      5. TRANSPOSITION
      6. X'X
      7. INVERSE
      8. DETERMINANT

 MATRIX/SCALAR OPERATIONS
      9. ADDITION
     10. SUBTRACTION
     11. MULTIPLICATION
     12. DIVISION

USE '0' TO ACCESS OTHER SECTIONS.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?4
```

```
COMPUTATION:  THE PRODUCT OF TWO MATRICES.

   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

        MATRIX #      LABEL        DIMENSION
   ----------------------------------------------
            1 - - - Y               7  X  1
            2 - - - X               7  X  3
            3 - - - X'              3  X  7
            4 - - - X'X             3  X  3
            5 - - - X'XINV          3  X  3

TYPE TWO AVAILABLE NUMBERS SEPARATED BY A COMMA.
THE OPERATION WILL BE PERFORMED IN THE ORDER THAT
THE MATRICES ARE ENTERED.    ENTER '0,0' TO EXIT.?3,1
```

```
BEFORE MULTIPLYING THEM...
DO YOU WANT THESE MATRICES PRINTED OUT ?

TYPE '0'  FOR NO
     '1'  FOR THE FIRST MATRIX ONLY
     '2'  FOR THE SECOND MATRIX ONLY
     '3'  FOR BOTH MATRICES
?3
```

```
MATRIX  #  3        X'

    1.00     1.00     1.00     1.00     1.00     1.00     1.00
   -0.08    -1.67     0.98     0.98    -0.08     0.98    -1.14
   -1.04    -1.43     0.66    -0.75     0.44     0.61     1.52


MATRIX  #  1        Y

   -1.18
   -1.52
    0.89
   -0.45
    0.22
    1.29
    0.76

                    TYPE '1' TO CONTINUE?1
```

```
--- RESULT ---   MATRIX  #  6

    0.00
    3.44
    6.38

DO YOU WANT THIS MATRIX SAVED ?     TYPE '1' FOR YES
                                         '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE A
LABEL OF UP TO 6 CHARACTERS.?X'Y
```

```
   **** STANDARD MATRIX OPERATIONS ****

MATRIX LIST      1: Y         2: X         3: X'        4: X'X        5: X'XINV
                 6: X'Y

      1. MATRIX LIST AND PRINTING

      2. ADDITION (OF TWO MATRICES)
      3. SUBTRACTION (OF TWO MATRICES)
      4. MATRIX MULTIPLICATION
      5. TRANSPOSITION
      6. X'X
      7. INVERSE
      8. DETERMINANT

 MATRIX/SCALAR OPERATIONS
      9. ADDITION
     10. SUBTRACTION
     11. MULTIPLICATION
     12. DIVISION

USE '0' TO ACCESS OTHER SECTIONS.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE 'Q'.?4
```

```
COMPUTATION:  THE PRODUCT OF TWO MATRICES.

   THE CURRENT MATRICES AVAILABLE ARE AS FOLLOWS:

         MATRIX #      LABEL        DIMENSION
   ---------------------------------------------
               1 - - - Y             7  X  1
               2 - - - X             7  X  3
               3 - - - X'            3  X  7
               4 - - - X'X           3  X  3
               5 - - - X'XINV        3  X  3
               6 - - - X'Y           3  X  1

TYPE TWO AVAILABLE NUMBERS SEPARATED BY A COMMA.
THE OPERATION WILL BE PERFORMED IN THE ORDER THAT
THE MATRICES ARE ENTERED.    ENTER '0,0' TO EXIT.?5,6
```

```
BEFORE MULTIPLYING THEM...
DO YOU WANT THESE MATRICES PRINTED OUT ?

TYPE '0'  FOR NO
     '1'  FOR THE FIRST MATRIX ONLY
     '2'  FOR THE SECOND MATRIX ONLY
     '3'  FOR BOTH MATRICES
?3
```

```
MATRIX  #  5       X'XINV

    0.14    0.00    0.00
    0.00    0.15   -0.03
    0.00   -0.03    0.15


MATRIX  #  6       X'Y

    0.00
    3.44
    6.38
                        TYPE '1' TO CONTINUE?1


 --- RESULT ---  MATRIX  #  7

    0.00
    0.34
    0.85

DO YOU WANT THIS MATRIX SAVED ?    TYPE '1' FOR YES
                                        '0' FOR NO ?1

FOR FUTURE IDENTIFICATION OF THIS NEW MATRIX, TYPE A
LABEL OF UP TO 6 CHARACTERS.?BETA
```

```
   **** STANDARD MATRIX OPERATIONS ****

MATRIX LIST      1: Y          2: X          3: X'         4: X'X        5: X'XINV
                 6: X'Y        7: BETA

      1. MATRIX LIST AND PRINTING

      2. ADDITION (OF TWO MATRICES)
      3. SUBTRACTION (OF TWO MATRICES)
      4. MATRIX MULTIPLICATION
      5. TRANSPOSITION
      6. X'X
      7. INVERSE
      8. DETERMINANT

 MATRIX/SCALAR OPERATIONS
      9. ADDITION
     10. SUBTRACTION
     11. MULTIPLICATION
     12. DIVISION

USE '0' TO ACCESS OTHER SECTIONS.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?0
```

```
     ****************************************
******** MATRIX OPERATIONS AND MANAGEMENT ********
     ****************************************

     1. MATRIX  MANAGEMENT
     2. STANDARD MATRIX OPERATIONS
     3. SPECIAL MATRIX OPERATORS

USE '0' TO EXIT.
TYPE THE NUMBER OF AN AVAILABLE OPTION, ELSE '0'.?0
```

```
          *****     WARNING     *****

ONCE YOU EXIT FROM THIS SECTION, YOUR MATRICES CANNOT BE RETRIEVED.

     TO EXIT FROM THIS SECTION,   TYPE '77'.
     TO REMAIN IN THIS SECTION,   TYPE '99'.?77
```

```
     COMPONENT 13.  DATA TRANSFORMATIONS

     1.  NULLARY, UNARY, AND BINARY OPERATIONS
     2.  SUFFICIENT STATISTICS
     3.  MATRIX OPERATIONS

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' )?0
```

```
COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12.  DATA MOVEMENT      ( INPUT/OUTPUT, EDITING )
13.  DATA TRANSFORMATIONS
14.  FILE MAINTENANCE  ( DATA GROUPING )

    * NOT YET AVAILABLE


TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?14
```

```
     COMPONENT 14.  FILE MAINTENANCE

     1. *DIRECTORY LISTINGS
     2. *FILE REORGANIZATION
     3.  FILE SORTING  ( DATA GROUPING )

        * NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' ).?3
```

DATA GROUPING

THIS MODULE ALLOWS YOU TO DIVIDE YOUR OBSERVATIONS INTO GROUPS. THERE MUST BE AT LEAST ONE GROUP, AND EACH GROUP MUST HAVE AT LEAST ONE OBSERVATION. THE MAXIMUM NUMBER OF GROUPS IS 12.

THERE ARE TWO WAYS TO IDENTIFY THE GROUPS :

1. THE GROUPS MAY BE IDENTIFIED ON THE BASIS OF ANY OF THE VARIABLES. SUPPOSE YOU HAVE THE VARIABLES SEX AND IQ. YOU COULD FORM A GROUP OF FEMALES WITH IQ'S ABOVE 110.
2. THE GROUPS CAN BE IDENTIFIED BY OBSERVATION NUMBERS AS THEY APPEAR IN THE DATA EDITTING MODULE.

ENTER THE NUMBER OF THE OPTION YOU WANT.?2

IF YOU WANT THE GROUPS TO BE MUTUALLY EXCLUSIVE (NO OBSERVATION IN MORE THAN ONE GROUP), YOU CAN SO INDICATE AND THE MODULE WILL CHECK TO SEE THAT THIS CONDITION IS MET. THE MODULE CAN ALSO CHECK TO SEE THAT THE GROUPS ARE MUTUALLY EXCLUSIVE AND EXHAUSTIVE (EACH OBSERVATION IN ONE AND ONLY ONE GROUP).

1. MUTUALLY EXCLUSIVE
2. MUTUALLY EXCLUSIVE AND EXHAUSTIVE
3. NEITHER OF THE ABOVE

ENTER THE NUMBER OF THE OPTION YOU WANT.?2

HOW MANY GROUPS DO YOU WANT TO FORM (MAXIMUM IS 12).?2

```
ENTER A NAME FOR GROUP 1     ?FIRST

IT IS ASSUMED THAT THE OBSERVATIONS YOU WANT IN THE GROUP ARE
IN BLOCKS OF CONSECUTIVELY NUMBERED OBSERVATIONS.  YOU ARE TO
ENTER THE FIRST AND LAST OBSERVATION NUMBERS IN EACH BLOCK.
IF A BLOCK IS ONLY 1 OBSERVATION, ENTER THE SAME NUMBER TWICE,
E.G., '4,4'.

ENTER THE FIRST AND LAST NUMBERS IN THE BLOCK ( EXIT='0,0' ).?1,3
ENTER THE FIRST AND LAST NUMBERS IN THE BLOCK ( EXIT='0,0' ).?0,0
```

```
HERE IS A SUMMARY OF THE GROUPS FORMED SO FAR.

GROUP        N                              IDENTIFIER

FIRST          3                    BY OBSERVATION NUMBERS

ENTER A NAME FOR GROUP 2     ?SECOND

ENTER THE FIRST AND LAST NUMBERS IN THE BLOCK ( EXIT='0,0' ).?4,7
ENTER THE FIRST AND LAST NUMBERS IN THE BLOCK ( EXIT='0,0' ).?0,0
```

DESCRIPTION OF THE DATA SET

GROUP	N	IDENTIFIER
FIRST	3	BY OBSERVATION NUMBERS
SECOND	4	BY OBSERVATION NUMBERS

VARIABLE 1 = VAR-01
VARIABLE 2 = VAR-02
VARIABLE 3 = VAR-03
WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

COMPONENT 14. FILE MAINTENANCE

1. *DIRECTORY LISTINGS
2. *FILE REORGANIZATION
3. FILE SORTING (DATA GROUPING)

* NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0').?0

```
COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12.  DATA MOVEMENT      ( INPUT/OUTPUT, EDITING )
13.  DATA TRANSFORMATIONS
14.  FILE MAINTENANCE  ( DATA GROUPING )

    * NOT YET AVAILABLE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?12
```

```
     COMPONENT 12.  DATA MOVEMENT

     1.  DATA ENTRY AND TRANSFERS
     2.  DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' )?2
```

```
DATA  EDITING

    1. DISPLAY AND EDIT OBSERVATIONS
    2. ADD OBSERVATIONS
    3. ADD VARIABLES
    4. DELETE VARIABLES
    5. CHANGE VARIABLE NAMES

ENTER THE NUMBER OF THE OPTION YOU WANT  ( ELSE '0' )?1
```

```
DATA SET NAME = HALD

GROUPS:        NAME                SIZE

           1 = FIRST               3
           2 = SECOND              4

ENTER THE NUMBER OF THE GROUP YOU WANT   ( NONE=0 ).?1
```

```
DATA SET = HALD      GROUP =  1!  FIRST       NO. OF OBS. = 3

                                       VARIABLES
 OBS.       1=VAR-01  2=VAR-02  3=VAR-03

OBSERVATIONS WILL BE DISPLAYED IN BLOCKS OF 10  (ENTER '0,0' TO EXIT).
ENTER THE 'FIRST,LAST' OBSERVATION NUMBERS TO BE DISPLAYED?1,3
```

```
DATA SET = HALD      GROUP =  1!  FIRST       NO. OF OBS. = 3

                                       VARIABLES
 OBS.       1=VAR-01  2=VAR-02  3=VAR-03
-------------------------------------------------------------
  1.            7.00     26.00     78.50
  2.            1.00     19.00     74.30
  3.           11.00     56.00    104.30
-------------------------------------------------------------
     1. CONTINUE WITHOUT EDITING
     2. DELETE AN OBSERVATION
     3. CHANGE AN OBSERVATION
     4. REDISPLAY THE OBSERVATIONS
     5. REINSTATE A DELETED OBSERVATION

ENTER THE NUMBER OF THE OPTION YOU WANT  ( ELSE 'O' )?O
```

```
          DATA  EDITING

     1. DISPLAY AND EDIT OBSERVATIONS
     2. ADD OBSERVATIONS
     3. ADD VARIABLES
     4. DELETE VARIABLES
     5. CHANGE VARIABLE NAMES

ENTER THE NUMBER OF THE OPTION YOU WANT  ( ELSE '0' )?1
```

```
DATA SET NAME = HALD

GROUPS:       NAME             SIZE

           1 = FIRST            3
           2 = SECOND           4

ENTER THE NUMBER OF THE GROUP YOU WANT   ( NONE=0 ).?2
```

```
DATA SET = HALD      GROUP =  2:  SECOND      NO. OF OBS. = 4

                                       VARIABLES
  OBS.       1=VAR-01  2=VAR-02  3=VAR-03

OBSERVATIONS WILL BE DISPLAYED IN BLOCKS OF 10  (ENTER '0,0' TO EXIT).
ENTER THE 'FIRST,LAST' OBSERVATION NUMBERS TO BE DISPLAYED?1,4
```

```
DATA SET = HALD      GROUP =  2:  SECOND      NO. OF OBS. = 4

                                       VARIABLES
  OBS.       1=VAR-01  2=VAR-02  3=VAR-03
-------------------------------------------------------------
  1.            11.00     31.00     87.60
  2.             7.00     52.00     95.90
  3.            11.00     55.00    109.20
  4.             3.00     71.00    102.70
-------------------------------------------------------------
     1. CONTINUE WITHOUT EDITING
     2. DELETE AN OBSERVATION
     3. CHANGE AN OBSERVATION
     4. REDISPLAY THE OBSERVATIONS
     5. REINSTATE A DELETED OBSERVATION

ENTER THE NUMBER OF THE OPTION YOU WANT  ( ELSE '0' )?0
```

```
DATA  EDITING

     1. DISPLAY AND EDIT OBSERVATIONS
     2. ADD OBSERVATIONS
     3. ADD VARIABLES
     4. DELETE VARIABLES
     5. CHANGE VARIABLE NAMES

ENTER THE NUMBER OF THE OPTION YOU WANT  ( ELSE '0' )?0
```

```
HERE IS A DESCRIPTION OF THE DATA SET.

NAME=HALD

VARIABLES
 1. VAR-01
 2. VAR-02
 3. VAR-03

GROUP  1       NAME = FIRST      SIZE=  3
GROUP  2       NAME = SECOND     SIZE=  4

TOTAL NUMBER OBSERVATIONS = 7

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1
```

```
COMPONENT 12.  DATA MOVEMENT

1.  DATA ENTRY AND TRANSFERS
2.  DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' )?0
```

```
COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12.  DATA MOVEMENT      ( INPUT/OUTPUT, EDITING )
13.  DATA TRANSFORMATIONS
14.  FILE MAINTENANCE  ( DATA GROUPING )

    * NOT YET AVAILABLE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?0
```

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?

Component Group 2

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?2

COMPONENT GROUP 2. SIMPLE BAYESIAN PARAMETRIC MODELS

21. BINARY MODELS
22. UNIVARIATE NORMAL MODELS
23. MULTI-CATEGORY MODELS
24. SIMPLE LINEAR REGRESSION ANALYSIS
25. MULTIPLE LINEAR REGRESSION ANALYSIS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?21

COMPONENT 21. BINARY MODELS

1. BETA BINOMIAL MODEL
2. BETA PASCAL MODEL
3. COMPARISON OF TWO PROPORTIONS

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?1

BETA BINOMIAL MODEL

1. PRIOR DISTRIBUTION ON PROPORTION (PI)
2. PREPOSTERIOR ANALYSIS
3. POSTERIOR DISTRIBUTION ON PI

* NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1

PRIOR DISTRIBUTION - BETA-BINOMIAL MODEL

THIS MODULE WILL ASSIST YOU IN FITTING A BETA DISTRIBUTION TO YOUR PRIOR BELIEFS ABOUT PI. WE BEGIN BY ASKING YOU TO SPECIFY THE 25TH, 50TH AND 75TH PERCENTILES OF YOUR PRIOR DISTRIBUTION.

SPECIFY 50TH. YOUR BETTING ODDS ARE EVEN THAT PI IS GREATER THAN THIS VALUE.?.4

SPECIFY 25TH. YOUR BETTING ODDS ARE 3 TO 1 THAT PI IS GREATER THAN THIS VALUE.?.3

SPECIFY 75TH. YOUR BETTING ODDS ARE 1 TO 3 THAT PI IS GREATER THAN THIS VALUE.?.6

POSSIBLE APPROXIMATE DISTRIBUTIONS ARE BEING COMPUTED.

HERE ARE SOME OF THE PERCENTILES OF FOUR BETA DISTRIBUTIONS THAT HAVE BEEN FITTED TO YOUR PERCENTILE SPECIFICATIONS.

	10TH	25TH	50TH	75TH	90TH
1	.22	.30	.40	.50	.60
2	.12	.23	.40	.59	.75
3	.19	.28	.40	.53	.65
4	.20	.29	.40	.52	.63

COMPARE THE PERCENTILES OF THESE DISTRIBUTIONS AND DECIDE WHICH MOST CLOSELY CORRESPONDS TO YOUR PRIOR BELIEFS. YOU CAN EITHER TENTATIVELY ACCEPT THIS DISTRIBUTION OR RESPECIFY THE PERCENTILES.

IF YOU WANT ONE OF THESE DISTRIBUTIONS TYPE ITS NUMBER.
IF YOU WANT TO RESPECIFY THE PERCENTILES   TYPE '0'.
?2

HERE ARE SOME CHARACTERISTICS OF THE BETA DISTRIBUTION YOU ARE NOW CONSIDERING.

HYPOTHETICAL SAMPLE SIZE (M)	3.52
10TH PERCENTILE	.12
25TH PERCENTILE	.23
50TH (MEDIAN)	.40
75TH PERCENTILE	.59
90TH PERCENTILE	.75
50% HDR	.15 - .51
75% HDR	.08 - .65
95% HDR	.02 - .83

IF YOU DO NOT FEEL THAT THE HYPOTHETICAL SAMPLE SIZE (M) REFLECTS YOUR PRIOR INFORMATION ABOUT PI YOU CAN SPECIFY A DIFFERENT VALUE FOR M. THIS WILL NOT AFFECT THE MEDIAN BUT WILL CHANGE THE HDRS AND OTHER PERCENTILES. A LARGER M WILL RESULT IN SHORTER INTERVALS, AND A SMALLER M IN LONGER ONES.

TO CHANGE M TYPE ITS NEW VALUE.
OTHERWISE '0'.?8

HERE ARE SOME CHARACTERISTICS OF THE BETA DISTRIBUTION YOU ARE NOW CONSIDERING.

HYPOTHETICAL SAMPLE SIZE (M)	8.00
10TH PERCENTILE	.20
25TH PERCENTILE	.29
50TH (MEDIAN)	.40
75TH PERCENTILE	.53
90TH PERCENTILE	.64
50% HDR	.26 - .50
75% HDR	.20 - .59
95% HDR	.11 - .72

TO CHANGE M TYPE ITS NEW VALUE.
OTHERWISE '0'.?0

TO CHANGE THE CENTERING OF THE DISTRIBUTION, SPECIFY A DIFFERENT MEDIAN. THIS WILL NOT AFFECT THE VALUE OF M. IF YOU WANT TO CHANGE MEDIAN TYPE NEW VALUE ELSE '0'.?0

HERE ARE SOME OF THE CHARACTERISTICS OF THE PRIOR DISTRIBUTION FITTED TO YOUR PRIOR BELIEFS ABOUT PI. YOU MAY WISH TO RECORD THE PARAMETERS OF YOUR PRIOR FOR THE POSTERIOR ANALYSIS.

PARAMETER A	3.27
PARAMETER B	4.73
MODE	.38
10TH PERCENTILE	.20
25TH PERCENTILE	.29
50TH (MEDIAN)	.40
75TH PERCENTILE	.53
90TH PERCENTILE	.64
50% HDR	.26 - .50
75% HDR	.20 - .59
95% HDR	.11 - .72

TYPE THE NUMBER OF OPTION YOU WANT
1. TO DO A PREPOSTERIOR ANALYSIS
2. TO DO A POSTERIOR ANALYSIS
3. TO CHANGE YOUR PRIOR
4. TO EXIT THE MODULE

?1

BETA BINOMIAL PREPOSTERIOR ANALYSIS

THIS MODULE WILL ASSIST YOU IN CARRYING OUT A PREPOSTERIOR ANALYSIS USING YOUR PRIOR DISTRIBUTION AND AN ADVERSARY PRIOR DISTRIBUTION.

THERE ARE TWO STEPS TO THE ANALYSIS. THE PURPOSE OF THE FIRST STEP IS TO GIVE YOU A ROUGH IDEA OF THE EFFECT OF DIFFERENT SAMPLE SIZES ON THE EXPECTED MEANS OF YOUR ADVERSARY POSTERIOR DISTRIBUTION. THESE ARE THE MEANS YOU WOULD EXPECT ACCORDING TO YOUR PRIOR DISTRIBUTION.

ONCE YOU HAVE A ROUGH IDEA OF THE SAMPLE SIZE YOU WANT YOU CAN PROCEED TO THE SECOND STEP AND LOOK IN MORE DETAIL AT YOUR EXPECTED ADVERSARY POSTERIOR DISTRIBUTIONS. YOU WILL BE ABLE TO GET THE PROBABILITY THAT PI IS GREATER THAN CERTAIN VALUES TO BE SPECIFIED BY YOU.

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1

```
INPUT THE PARAMETERS OF THE ADVERSARY PRIOR DISTRIBUTION.

INPUT A.?4
INPUT B.?4
```

```
INPUT THE NUMBER OF DIFFERENT SAMPLE SIZES YOU WANT TO
CONSIDER.  (EXIT=0  MAX=10)?5

INPUT THE SAMPLE SIZES.

SAMPLE SIZE  1?5
SAMPLE SIZE  2?10
SAMPLE SIZE  3?15
SAMPLE SIZE  4?30
SAMPLE SIZE  5?50
```

HERE ARE THE MEANS OF THE PRIOR DISTRIBUTIONS AND THE EXPECTED MEANS OF THE ADVERSARY POSTERIOR DISTRIBUTION.

INVESTIGATOR	PRIOR DISTRIBUTIONS	ADVERSARY
3.27	PARAMETER A	4.00
4.73	PARAMETER B	4.00
.41	MEAN	.50

SAMPLE SIZE	EXPECTED MEAN OF ADVERSARY POSTERIOR DISTRIBUTION
5	.46
10	.45
15	.44
30	.43
50	.42

IF YOU WANT TO TRY MORE N VALUES TYPE '1' ELSE '0'.?0

THIS IS THE BEGINNING OF THE SECOND STEP IN THE ANALYSIS.

THE MODULE WILL COMPUTE AND PRINT THE PROBABILITY THAT PI IS LESS THAN PI' FOR THE EXPECTED ADVERSARY POSTERIOR DISTRIBUTION. YOU ARE TO SPECIFY PI' AND THE SAMPLE SIZE.

THE MINIMUM SAMPLE SIZE IS 5 AND THE MAXIMUM IS 200.

INPUT THE SAMPLE SIZE YOU WANT TO CONSIDER. (NONE=0)?30

INPUT THE NUMBER OF PI' VALUES YOU WANT TO SPECIFY (MAX=4).?4

INPUT PI' ?.2
INPUT PI' ?.4
INPUT PI' ?.5
INPUT PI' ?.6

HERE ARE THE PRIOR AND POSTERIOR PROBABILITIES THAT PI IS LESS THAN PI' FOR A SAMPLE OF SIZE N.

N = 30

	YOU	ADVERSARY	
PI'	PRIOR/POSTERIOR	PRIOR	POSTERIOR
0.20	0.10	0.03	0.08
0.40	0.50	0.29	0.45
0.50	0.71	0.50	0.67
0.60	0.86	0.71	0.84

TYPE THE NUMBER OF THE OPTION YOU WANT.

1. TRY A DIFFERENT SET OF N AND/OR PI' VALUES.
2. DO ANOTHER PREPOSTERIOR ANALYSIS WITH A DIFFERENT ADVERSARY.
3. DO THE POSTERIOR ANALYSIS.
4. EXIT MODULE

?3

POSTERIOR ANALYSIS BETA-BINOMIAL MODEL

ENTER NUMBER OF SAMPLE OBSERVATIONS.?30

ENTER NUMBER OF SUCCESSES.?10

SOME OF THE CHARACTERISTICS OF THE POSTERIOR DISTRIBUTION ARE BEING COMPUTED.

SUMMARY OF BETA-BINOMIAL ANALYSIS

PRIOR	BETA DISTRIBUTIONS	POSTERIOR
3.27	PARAMETER A	13.27
4.73	PARAMETER B	24.73
.1638	STANDARD DEVIATION	.0763
.20	10TH PERCENTILE	.25
.29	25TH PERCENTILE	.30
.40	50TH PERCENTILE	.35
.52	75TH PERCENTILE	.40
.63	90TH PERCENTILE	.45
.41	MEAN	.35
.38	MODE	.34
.26 - .50	50% HDR	.29 - .39
.20 - .59	75% HDR	.26 - .43
.11 - .72	95% HDR	.20 - .50

TYPE THE NUMBER OF OPTIONS YOU WANT

1. EVALUATE THE POSTERIOR DISTRIBUTION.
2. EVALUATE THE PREDICTIVE DISTRIBUTION.
3. EXIT THE MODULE.

?2

EVALUATION OF A BETA-BINOMIAL DISTRIBUTION

THIS MODULE WILL HELP YOU EXAMINE THE CHARACTERISTICS OF A BETA BINOMIAL DISTRIBUTION.

X IS ASSUMED TO HAVE A BINOMIAL DISTRIBUTION WITH SAMPLE SIZE PARAMETER N AND PROCESS (PROPORTION) PARAMETER P.
(NOTE: N MUST NOT BE GREATER THAN 200.)

P IS ASSUMED TO HAVE A BETA DISTRIBUTION WITH PARAMETERS A AND B.

INPUT THE SAMPLE SIZE PARAMETER N (MAX=200).?10

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. PROBABILITIES THAT THE NUMBER OF SUCCESSES WILL BE
         LESS THAN X, EQUAL TO X, AND GREATER THAN X.
      2. PROBABILITY THAN THE NUMBER OF SUCCESSES WILL BE
         FROM X1 THROUGH X2.
      3. END EVALUATION OF BETA-BINOMIAL DISTRIBUTION
?1
```

```
     OPTION 1:  PROBABILITIES THAT THE NUMBER OF SUCCESSES (S)
     WILL BE LESS THAN X, EQUAL TO X, AND GREATER THAN X.

TO EXIT ROUTINE TYPE -7777 WHEN ASKED TO INPUT X.
---------------------------------------------------------------
            BETA  BINOMIAL  DISTRIBUTION
PROCESS PARAMETER P: BETA (A =  13.27 B =  24.73)
SAMPLE SIZE PARAMETER N =  10
MEAN =    3.49              STANDARD DEVIATION =    1.67
---------------------------------------------------------------
                         X     P( S<X )     P( S=X )     P( S>X )
INPUT X.?4
                         4       0.52         0.21         0.27
INPUT X.?3
                         3       0.29         0.23         0.48
INPUT X.?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER BETA BINOMIAL DISTRIBUTION.
     3. END EVALUATION OF BETA BINOMIAL DISTRIBUTIONS.
?3
```

```
TYPE THE NUMBER OF OPTIONS YOU WANT
     1.  EVALUATE THE POSTERIOR DISTRIBUTION.
     2.  EVALUATE THE PREDICTIVE DISTRIBUTION.
     3.  EXIT THE MODULE.
?3
```

```
        BETA BINOMIAL MODEL

    1. PRIOR DISTRIBUTION ON PROPORTION (PI)
    2. PREPOSTERIOR ANALYSIS
    3. POSTERIOR DISTRIBUTION ON PI

    * NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0
```

```
    COMPONENT 21. BINARY MODELS

    1. BETA BINOMIAL MODEL
    2. BETA PASCAL MODEL
    3. COMPARISON OF TWO PROPORTIONS

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?2
```

BETA PASCAL MODEL

1. PRIOR DISTRIBUTION ON PROPORTION (PI)
*2. PREPOSTERIOR ANALYSIS
3. POSTERIOR DISTRIBUTION ON PI

* NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1

PRIOR DISTRIBUTION - BETA PASCAL MODEL

THIS MODULE WILL ASSIST YOU IN FITTING A BETA DISTRIBUTION TO YOUR PRIOR BELIEFS ABOUT PI. WE BEGIN BY ASKING YOU TO SPECIFY THE 25TH, 50TH AND 75TH PERCENTILES OF YOUR PRIOR DISTRIBUTION.

SPECIFY 50TH. YOUR BETTING ODDS ARE EVEN THAT PI IS GREATER THAN THIS VALUE.?.4

SPECIFY 25TH. YOUR BETTING ODDS ARE 3 TO 1 THAT PI IS GREATER THAN THIS VALUE.?.3

SPECIFY 75TH. YOUR BETTING ODDS ARE 1 TO 3 THAT PI IS GREATER THAN THIS VALUE.?.6

POSSIBLE APPROXIMATE DISTRIBUTIONS ARE BEING COMPUTED.

HERE ARE SOME OF THE PERCENTILES OF FOUR BETA DISTRIBUTIONS
THAT HAVE BEEN FITTED TO YOUR PERCENTILE SPECIFICATIONS.

	10TH	25TH	50TH	75TH	90TH
1	.22	.30	.40	.50	.60
2	.12	.23	.40	.59	.75
3	.19	.28	.40	.53	.65
4	.20	.29	.40	.52	.63

COMPARE THE PERCENTILES OF THESE DISTRIBUTIONS AND DECIDE
WHICH MOST CLOSELY CORRESPONDS TO YOUR PRIOR BELIEFS.
YOU CAN EITHER TENTATIVELY ACCEPT THIS DISTRIBUTION OR
RESPECIFY THE PERCENTILES.

IF YOU WANT ONE OF THESE DISTRIBUTIONS TYPE ITS NUMBER.
IF YOU WANT TO RESPECIFY THE PERCENTILES TYPE '0'.
?2

HERE ARE SOME CHARACTERISTICS OF THE BETA DISTRIBUTION YOU
ARE NOW CONSIDERING.

HYPOTHETICAL SAMPLE SIZE (M)	3.52
10TH PERCENTILE	.12
25TH PERCENTILE	.23
50TH (MEDIAN)	.40
75TH PERCENTILE	.59
90TH PERCENTILE	.75
50% HDR	.15 - .51
75% HDR	.08 - .65
95% HDR	.02 - .83

IF YOU DO NOT FEEL THAT THE HYPOTHETICAL SAMPLE SIZE (M)
REFLECTS YOUR PRIOR INFORMATION ABOUT PI YOU CAN SPECIFY A
DIFFERENT VALUE FOR M. THIS WILL NOT AFFECT THE MEDIAN BUT
WILL CHANGE THE HDRS AND OTHER PERCENTILES. A LARGER M WILL
RESULT IN SHORTER INTERVALS, AND A SMALLER M IN LONGER ONES.

IF YOU WANT TO CHANGE M TYPE NEW VALUE (AT LEAST 3.52).
IF YOU DO NOT WANT TO CHANGE M TYPE '0'?8

```
HERE ARE SOME CHARACTERISTICS OF THE BETA DISTRIBUTION YOU
ARE NOW CONSIDERING.

        HYPOTHETICAL SAMPLE SIZE (M)        8.00
        10TH PERCENTILE                      .20
        25TH PERCENTILE                      .29
        50TH  (MEDIAN)                       .40
        75TH PERCENTILE                      .53
        90TH PERCENTILE                      .64
        50% HDR                        .26 - .50
        75% HDR                        .20 - .59
        95% HDR                        .11 - .72

IF YOU WANT TO CHANGE M TYPE NEW VALUE (AT LEAST  3.52).
IF YOU DO NOT WANT TO CHANGE M TYPE '0'?0

TO CHANGE THE CENTERING OF THE DISTRIBUTION, SPECIFY
A DIFFERENT MEDIAN.  THIS WILL NOT AFFECT THE VALUE OF M.
IF YOU WANT TO CHANGE MEDIAN TYPE NEW VALUE ELSE '0'.?0




HERE ARE SOME OF THE CHARACTERISTICS OF THE PRIOR
DISTRIBUTION FITTED TO YOUR PRIOR BELIEFS ABOUT PI.
YOU MAY WISH TO RECORD THE PARAMETERS OF YOUR PRIOR
FOR THE POSTERIOR ANALYSIS.

        PARAMETER A                         3.27
        PARAMETER B                         4.73
        MODE                                 .38
        10TH PERCENTILE                      .20
        25TH PERCENTILE                      .29
        50TH  (MEDIAN)                       .40
        75TH PERCENTILE                      .53
        90TH PERCENTILE                      .64
        50% HDR                        .26 - .50
        75% HDR                        .20 - .59
        95% HDR                        .11 - .72

TYPE THE NUMBER OF OPTION YOU WANT
  1.   TO DO A POSTERIOR ANALYSIS
  2.   TO CHANGE YOUR PRIOR
  3.   TO EXIT THE MODULE
?1
```

POSTERIOR ANALYSIS BETA PASCAL MODEL

ENTER NUMBER OF SAMPLE OBSERVATIONS.?30

ENTER NUMBER OF SUCCESSES.?10

SOME OF THE CHARACTERISTICS OF THE POSTERIOR DISTRIBUTION ARE BEING COMPUTED.

SUMMARY OF BETA PASCAL ANALYSIS

PRIOR	BETA DISTRIBUTIONS	POSTERIOR
3.27	PARAMETER A	13.27
4.73	PARAMETER B	24.73
.1638	STANDARD DEVIATION	.0763
.20	10TH PERCENTILE	.25
.29	25TH PERCENTILE	.30
.40	50TH PERCENTILE	.35
.52	75TH PERCENTILE	.40
.63	90TH PERCENTILE	.45
.41	MEAN	.35
.38	MODE	.33
.26 - .50	50% HDR	.29 - .39
.20 - .59	75% HDR	.26 - .43
.10 - .72	95% HDR	.20 - .50

TYPE THE NUMBER OF OPTIONS YOU WANT

1. EVALUATE POSTERIOR DISTRIBUTION.
2. EVALUATE PREDICTIVE DISTRIBUTION.
3. EXIT THE MODULE.

?2

EVALUATION OF BETA PASCAL DISTRIBUTION

THIS MODULE WILL HELP YOU EXAMINE THE CHARACTERISTICS OF A BETA PASCAL DISTRIBUTION.

N IS ASSUMED TO HAVE A PASCAL DISTRIBUTION WITH SUCCESS PARAMETER S AND PROCESS (PROPORTION) PARAMETER P.

P IS ASSUMED TO HAVE A BETA DISTRIBUTION WITH PARAMETERS A AND B.

INPUT THE SUCCESS PARAMETER S.?4

TYPE THE NUMBER OF THE OPTION YOU WANT.
1. PROBABILITIES THAT THE NUMBER (N) OF TRIALS NEEDED WILL BE LESS THAN X, EQUAL TO X, AND GREATER THAN X.
2. PROBABILITY THAT THE NUMBER (N) OF TRIALS NEEDED WILL BE BETWEEN X1 AND X2 INCLUSIVE.
3. END EVALUATION OF BETA-PASCAL DISTRIBUTIONS.

?1

```
     OPTION 1: PROBABILITIES THAT THE NUMBER (N) OF TRIALS
     NEEDED WILL BE LESS THAN X, EQUAL TO X, AND GREATER THAN X.

TO EXIT ROUTINE TYPE -7777 WHEN ASKED TO INPUT X.
----------------------------------------------------------------
            BETA  PASCAL DISTRIBUTION
P DISTRIBUTED BETA ( A =    13.27     B =    24.73 )
SUCCESS PARAMETER S =   4         MEAN =  12.07
----------------------------------------------------------------
                        X     P( N<X )     P( N=X )     P( N>X )
INPUT X.?10
                       10      0.39         0.08         0.52
INPUT X.?-7777




TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER BETA PASCAL DISTRIBUTION.
     3. END EVALUATION OF BETA-PASCLAL DISTRIBUTIONS.
?2

INPUT THE SUCCESS PARAMETER S.?3
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PROBABILITIES THAT THE NUMBER (N) OF TRIALS NEEDED
        WILL BE LESS THAN X, EQUAL TO X, AND GREATER THAN X.
     2. PROBABILITY THAT THE NUMBER (N) OF TRIALS NEEDED
        WILL BE BETWEEN X1 AND X2 INCLUSIVE.
     3. END EVALUATION OF BETA-PASCAL DISTRIBUTIONS.
?1
```

```
     OPTION 1: PROBABILITIES THAT THE NUMBER (N) OF TRIALS
     NEEDED WILL BE LESS THAN X, EQUAL TO X, AND GREATER THAN X.

TO EXIT ROUTINE TYPE -7777 WHEN ASKED TO INPUT X.
-------------------------------------------------------------
            BETA  PASCAL DISTRIBUTION
P DISTRIBUTED BETA ( A =    13.27    B =    24.73 )
SUCCESS PARAMETER S =   3        MEAN =    9.05
-------------------------------------------------------------
                        X     P( N<X )    P( N=X )    P( N>X )
INPUT X.?10
                       10       0.64        0.07        0.29
INPUT X.?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER BETA PASCAL DISTRIBUTION.
     3. END EVALUATION OF BETA-PASCLAL DISTRIBUTIONS.
?3
```

```
TYPE THE NUMBER OF OPTIONS YOU WANT
   1.  EVALUATE POSTERIOR DISTRIBUTION.
   2.  EVALUATE PREDICTIVE DISTRIBUTION.
   3.  EXIT THE MODULE.
?3
```

```
  BETA PASCAL MODEL

 1. PRIOR DISTRIBUTION ON PROPORTION (PI)
*2. PREPOSTERIOR ANALYSIS
 3. POSTERIOR DISTRIBUTION ON PI

 * NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0
```

```
 COMPONENT 21. BINARY MODELS

 1. BETA BINOMIAL MODEL
 2. BETA PASCAL MODEL
 3. COMPARISON OF TWO PROPORTIONS

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?3
```

```
COMPARISON OF TWO PROPORTIONS

 1. INDEPENDENT BETA DISTRIBUTED PROPORTIONS
*2. NON-INDEPENDENTLY DISTRIBUTED PROPORTIONS

 * NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1
```

```
COMPARISON OF TWO PROPORTIONS-INDEPENDENT BETAS

THIS MODULE ALLOWS YOU TO COMPARE TWO INDEPENDENTLY BETA
DISTRIBUTED PROPORTIONS.

THE MODULE WILL COMPUTE AND PRINT THE PROBABILITY THAT THE
DIFFERENCE OF THE TWO PROPORTIONS IS GREATER THAN K WHICH
IS TO BE SPECIFIED BY YOU.  THE MODULE ALWAYS USES AS THE
THE DIFFERENCE THE BETA DISTRIBUTION WITH THE LARGER MEAN
MINUS THE ONE WITH THE SMALLER MEAN.
INPUT THE PARAMETERS OF THE DISTRIBUTION ON PI-ONE (PI-1).

ENTER PARAMETER A.?3
ENTER PARAMETER B.?6

INPUT THE PARAMETERS OF THE DISTRIBUTION ON PI-TWO (PI-2).

ENTER PARAMETER A.?4
ENTER PARAMETER B.?4
```

```
THE MODULE WILL COMPUTE AND PRINT THE PROBABILITIES FOR
THE DIFFERENCE    P1-2  MINUS  PI-1.


YOU CAN SPECIFY UP TO 5 K VALUES AT A TIME.  THE MODULE WILL
COMPUTE AND PRINT THE PROBABILITIES FOR THESE VALUES AND THEN
ALLOW YOU TO SPECIFY MORE VALUES IF YOU WANT.

IF, FOR EXAMPLE, YOU WANTED THE PROBABILITY THAT PI-2 IS
GREATER THAN PI-1 YOU WOULD SPECIFY A VALUE OF 0 FOR K.

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1
```

```
INPUT THE NUMBER OF K VALUES YOU WANT TO SPECIFY.?4
INPUT VALUE  1  ?0
INPUT VALUE  2  ?.2
INPUT VALUE  3  ?.4
INPUT VALUE  4  ?.5
```

```
  PI-1          BETA DISTRIBUTIONS              PI-2
--------------------------------------------------------
  3.00             PARAMETER A                  4.00
  6.00             PARAMETER B                  4.00
  0.33                MEAN                      0.50
--------------------------------------------------------
          DIFFERENCE (PI-2 MINUS PI-1)
                      MEAN                       .17
               STANDARD DEVIATION               0.22
--------------------------------------------------------
          PROB( DIFF >  0.000 )=0.77
          PROB( DIFF >  0.200 )=0.45
          PROB( DIFF >  0.400 )=0.15
          PROB( DIFF >  0.500 )=0.07
--------------------------------------------------------
WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1



TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER COMPARE THESE TWO PROPORTIONS
     2. COMPARE TWO OTHER PROPORTIONS
     3. EXIT MODULE
?3
```

COMPARISON OF TWO PROPORTIONS

1. INDEPENDENT BETA DISTRIBUTED PROPORTIONS
*2. NON-INDEPENDENTLY DISTRIBUTED PROPORTIONS

* NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0

COMPONENT 21. BINARY MODELS

1. BETA BINOMIAL MODEL
2. BETA PASCAL MODEL
3. COMPARISON OF TWO PROPORTIONS

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?0

```
COMPONENT GROUP 2.  SIMPLE BAYESIAN PARAMETRIC MODELS

21.  BINARY MODELS
22.  UNIVARIATE NORMAL MODELS
23.  MULTI-CATEGORY MODELS
24.  SIMPLE LINEAR REGRESSION ANALYSIS
25.  MULTIPLE LINEAR REGRESSION ANALYSIS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?22
```

```
     COMPONENT 22. UNIVARIATE NORMAL MODELS

     1. TWO PARAMETER NORMAL(NATURAL CONJUGATE PRIORS)
     2. COMPARISON OF TWO NORMAL MEANS
     3. COMPARISON OF TWO STANDARD DEVIATIONS


IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?1
```

TWO PARAMETER NORMAL (NATURAL CONJUGATE PRIORS)

1. PRIOR DISTRIBUTION ON STANDARD DEVIATION (SIGMA)
2. PRIOR DISTRIBUTION ON MEAN (MU)
3. ADVERSARY PREPOSTERIOR ANALYSIS
4 CONSENSUS PREPOSTERIOR ANALYSIS
5. POSTERIOR DISTRIBUTIONS ON MU AND SIGMA

* NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1

PRIOR DISTRIBUTION ON THE STANDARD DEVIATION

THIS MODULE WILL ASSIST YOU IN FITTING AN INVERSE CHI DISTRIBUTION TO YOUR PRIOR BELIEFS ABOUT THE STANDARD DEVIATION OF A NORMAL DISTRIBUTION

WE BEGIN BY ASKING YOU TO SPECIFY THE 25TH, 50TH AND 75TH PERCENTILES OF YOUR PRIOR DISTRIBUTION.

SPECIFY 50TH PERCENTILE. YOUR BETTING ODDS ARE EVEN THAT THE STANDARD DEVIATION IS LESS THAN THIS VALUE. INPUT 50TH.?5

SPECIFY 25TH PERCENTILE. YOUR BETTING ODDS ARE 3 TO 1 THAT THE STANDARD DEVIATION IS GREATER THAN THIS VALUE. INPUT 25TH.?3

SPECIFY 75TH PERCENTILE. YOUR BETTING ODDS ARE 1 TO 3 THAT THE STANDARD DEVIATION IS GREATER THAN THIS VALUE. INPUT 75TH.?10

FOUR POSSIBLE APPROXIMATE PRIOR DISTRIBUTIONS ARE NOW BEING COMPUTED FOR YOUR CONSIDERATION.

HERE ARE THE PERCENTILES OF FOUR INVERSE CHI DISTRIBUTIONS FITTED TO YOUR PERCENTILE SPECIFICATIONS.

	10TH	25TH	50TH	75TH	90TH
1	2.32	2.99	4.22	6.55	10.80
2	3.53	4.55	6.42	9.95	16.41
3	2.74	3.54	4.99	7.74	12.77
4	3.14	4.04	5.70	8.84	14.59

COMPARE THE PERCENTILES OF THESE DISTRIBUTIONS AND DECIDE WHICH MOST CLOSELY CORRESPONDS TO YOUR PRIOR BELIEFS. YOU CAN EITHER TENTATIVELY ACCEPT THIS DISTRIBUTION OR SPECIFY NEW VALUES FOR THE PERCENTILES.

IF YOU WANT ONE OF THE DISTRIBUTION TYPE ITS NUMBER.
IF YOU WANT TO RESPECIFY THE PERCENTILES TYPE '0'.
?3

HERE ARE SOME OF THE CHARACTERISTICS OF THE INVERSE CHI DISTRIBUTION YOU ARE NOW CONSIDERING.

HYPOTHETICAL SAMPLE SIZE(M)	3.01		
10TH PERCENTILE	2.74		
25TH PERCENTILE	3.54		
50TH (MEDIAN)	4.99		
75TH PERCENTILE	7.74		
90TH PERCENTILE	12.77		
50% HDR	2.40	TO	5.36
75% HDR	1.97	TO	7.95
95% HDR	1.52	TO	18.34

IF YOU DO NOT FEEL THAT THIS HYPOTHETICAL SAMPLE SIZE (M) REFLECTS YOUR PRIOR INFORMATION ABOUT THE STANDARD DEVIATION YOU CAN SPECIFY A DIFFERENT ONE. A DIFFERENT M WILL NOT AFFECT THE MEDIAN, BUT WILL CHANGE THE HDRS AND OTHER PERCENTILES. A LARGER M WILL SHORTEN THE HDR INTERVALS, AND A SMALLER M WILL LENGTHEN THEM.

IF YOU WANT TO CHANGE M TYPE THE NEW VALUE (GREATER THAN 3).
IF YOU DO NOT WANT TO CHANGE M TYPE '0'.
?8

```
HERE ARE SOME OF THE CHARACTERISTICS OF THE INVERSE CHI
DISTRIBUTION YOU ARE NOW CONSIDERING.

        HYPOTHETICAL SAMPLE SIZE(M)    8.00
        10TH PERCENTILE                3.63
        25TH PERCENTILE                4.18
        50TH  (MEDIAN)                 4.99
        75TH PERCENTILE                6.10
        90TH PERCENTILE                7.49
        50% HDR                    3.72 TO       5.45
        75% HDR                    3.32 TO       6.39
        95% HDR                    2.79 TO       8.71

IF YOU WANT TO CHANGE M TYPE NEW VALUE ELSE '0'.?0

YOU CAN CHANGE THE CENTERING OF THE DISTRIBUTION BY
SPECIFYING A DIFFERENT MEDIAN.  THIS WILL NOT AFFECT
THE HYPOTHETICAL SAMPLE SIZE.

IF YOU WANT TO CHANGE THE MEDIAN TYPE THE NEW VALUE.
IF YOU DO NOT TYPE '0'.
?5
```

```
HERE ARE SOME OF THE CHARACTERISTICS OF THE INVERSE CHI
DISTRIBUTION YOU ARE NOW CONSIDERING.

        HYPOTHETICAL SAMPLE SIZE(M)    8.00
        10TH PERCENTILE                3.63
        25TH PERCENTILE                4.19
        50TH  (MEDIAN)                 5.00
        75TH PERCENTILE                6.11
        90TH PERCENTILE                7.50
        50% HDR                    3.72 TO       5.46
        75% HDR                    3.32 TO       6.40
        95% HDR                    2.80 TO       8.72

IF YOU WANT TO CHANGE M TYPE NEW VALUE ELSE '0'.?0

IF YOU WANT TO CHANGE THE MEDIAN TYPE THE NEW VALUE.
IF YOU DO NOT TYPE '0'.
?0
```

HERE ARE SOME OF THE CHARACTERISTICS OF THE INVERSE CHI DISTRIBUTION FITTED TO YOUR PRIOR BELIEFS ABOUT SIGMA.

HYPOTHETICAL SAMPLE SIZE(M)	8.00		
DEGREES OF FREEDOM	7.00		
SCALE PARAMETER	12.59		
MODE	4.45		
10TH PERCENTILE	3.63		
25TH PERCENTILE	4.19		
50TH (MEDIAN)	5.00		
75TH PERCENTILE	6.11		
90TH PERCENTILE	7.50		
50% HDR	3.72	TO	5.46
75% HDR	3.32	TO	6.40
95% HDR	2.80	TO	8.72

THIS COMPLETES THE SPECIFICATION OF A PRIOR DISTRIBUTION ON SIGMA. IF YOU DO NOT WANT TO FIT A PRIOR DISTRIBTION ON THE MEAN YOU SHOULD RECORD THE PARAMETERS OF YOUR PRIOR DISTRIBUTION ON SIGMA (DEGREES AND SCALE).

IF YOU WANT TO SPECIFY THE PRIOR ON THE MEAN TYPE '1'.
TO EXIT THE MODULE TYPE '0'.
?1

PRIOR DISTRIBUTION ON THE MEAN

THIS MODULE WILL ASSIST YOU IN SPECIFYING A PRIOR DISTRIBUTION ON THE MEAN OF A NORMAL DISTRIBUTION.

SUPPOSE THE POPULATION STANDARD DEVIATION IS 5.00.
SPECIFY THE 25TH, 50TH, AND 90TH PERCENTILES OF YOUR PRIOR DISTRIBUTION ON THE POPULATION MEAN.

SPECIFY 50TH. YOUR ODDS ARE EVEN THAT THE MEAN IS LESS THAN THIS VALUE.?10

SPECIFY 25TH. YOUR BETTING ODDS ARE 3 TO 1 THAT THE MEAN IS MORE THAN THIS VALUE.?6

SPECIFY 90TH. YOUR ODDS ARE 9 TO 1 THAT THE MEAN IS LESS THAN THIS VALUE.?16

HERE ARE THE PERCENTILES OF FOUR NORMAL DISTRIBUTIONS FITTED TO YOUR PERCENTILE SPECIFICATIONS.

	10TH	25TH	50TH	75TH	90TH
1	2.40	6.00	10.00	14.00	17.60
2	4.00	6.84	10.00	13.16	16.00
3	2.90	6.00	9.45	12.90	16.00
4	3.18	6.28	9.72	13.17	16.27

COMPARE THE PERCENTILES OF THESE DISTRIBUTIONS AND DECIDE WHICH DISTRIBUTION MOST CLOSELY CORRESPONDS TO YOUR PRIOR BELIEFS. YOU CAN EITHER TENTATIVELY ACCEPT ONE OF THESE DISTRIBUTIONS OR RESPECIFY THE PERCENTILES.

IF YOU WANT ONE OF THE DISTRIBUTIONS TYPE ITS NUMBER.
IF YOU WANT TO RESPECIFY THE PERCENTILES TYPE '0'.
?1

HERE ARE SOME OF THE CHARACTERISTICS OF THE NORMAL DISTRIBUTION YOU ARE NOW CONSIDERING. THIS IS A CONDITIONAL DISTRIBUTION SINCE IT IS ASSUMED THAT THE POPULATION STANDARD DEVIATION IS 5.00.

HYPOTHETICAL SAMPLE SIZE (M)	0.71
MEAN=MODE=MEDIAN	10.00
STANDARD DEVIATION	5.93
10TH PERCENTILE	2.40
25TH PERCENTILE	6.00
75TH PERCENTILE	14.00
90TH PERCENTILE	17.60

IF YOU DO NOT FEEL THAT THIS VALUE OF M REFLECTS YOUR PRIOR INFORMATION ABOUT THE MEAN YOU CAN SPECIFY A DIFFERENT M. A SMALLER M WILL GIVE LONGER INTERVALS AND A LARGER M SHORTER INTERVALS.

IF YOU WANT TO CHANGE M TYPE THE NEW VALUE ELSE '0'.?5

```
HERE ARE SOME OF THE CHARACTERISTICS OF THE NORMAL
DISTRIBUTION YOU ARE NOW CONSIDERING.

HYPOTHETICAL SAMPLE SIZE (M)        5.00
MEAN=MODE=MEDIAN                   10.00
STANDARD DEVIATION                  2.24
10TH PERCENTILE                     7.13
25TH PERCENTILE                     8.49
75TH PERCENTILE                    11.51
90TH PERCENTILE                    12.87

IF YOU WANT TO CHANGE M TYPE THE NEW VALUE ELSE '0'.?0

YOU CAN CHANGE THE CENTERING OF THE DISTRIBUTION BY
SPECIFYING A DIFFERENT MEDIAN.  THIS WILL NOT AFFECT
THE HYPOTHETICAL SAMPLE SIZE.

IF YOU WANT TO SPECIFY A DIFFERENT MEDIAN TYPE '1'.
IF YOU DO NOT TYPE '0'.
?0
```

```
HERE ARE SOME OF THE CHARACTERISTICS OF THE PRIOR MARGINAL
DISTRIBUTION ON THE MEAN.

           STUDENT'S T DISTRIBUTION

DEGREES OF FREEDOM                  7.00
SCALE PARAMETER                    31.73
MEAN=MODE=MEDIAN                   10.00
STANDARD DEVIATION                  2.52
50% HDR                      8.50 TO        11.50
75% HDR                      7.36 TO        12.64
95% HDR                      5.09 TO        14.91

WHEN YOU ARE READY TO CONTINUE     TYPE '1'?1
```

```
THIS COMPLETES THE SPECIFICATION OF PRIOR DISTRIBUTION, YOU
MAY WISH TO RECORD THE FOLLOWING NUMBERS FOR LATER ANALYSIS.

THE PRIOR DISTRIBUTION ON THE STANDARD DEVIATION HAS AN
INVERSE CHI DISTRIBUTION WITH  7    DEGREES OF FREEDOM
AND THE SCALE PARAMETER  12.59.

THE PRIOR DISTRIBUTION ON THE MEAN HAS STUDENT'S T DISTRIBUTION
WITH MEAN  10    AND SCALE PRAAMETER  31.7251


TYPE THE NUMBER OF OPTION YOU WANT
      1.  ADVERSARY PREPOSTERIOR ANALYSIS
      2.  CONSENSUS PREPOSTERIOR ANALYSIS
      3.  POSTERIOR ANALYSIS
      4.  EXIT THE MODULE
?1
```

```
   ADVERSARY PREPOSTERIOR ANALYSIS FOR TWO-PARAMETER NORMAL

THE PURPOSE OF AN ADVERSARY PREPOSTERIOR ANALYSIS IS TO GIVE
YOU THE OPPORTUNITY TO SEE WHAT YOUR PRIOR BELIEFS IMPLY YOU
EXPECT AN ADVERSARY (SOMEONE WITH DIFFERENT PRIOR BELIEFS)
TO BELIEVE AFTER SOME SAMPLE OBSERVATIONS ARE MADE.  YOU, OF
COURSE, EXPECT THE SAMPLE DATA TO BE CONSISTENT WITH YOUR PRIOR
BELIEFS.

FIRST, THE MODULE ALLOWS YOU TO SEE THE EFFECT OF DIFFERENT SAMPLE
SIZES ON THE MEAN AND STANDARD DEVIATION OF THE PREPOSTERIOR
DISTRIBUTION.  THIS SHOULD PROVIDE YOU WITH A ROUGH IDEA OF THE
EXPECTED EFFECT OF DIFFERENT SAMPLE SIZES.  YOU CAN THEN LOOK
MORE CLOSELY AT THE PREPOSTERIOR DISTRIBUTION FOR DIFFERENT
SAMPLE SIZES.

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1
```

```
THE MODULE ALLOWS YOU TO CARRY OUT AN  ANALYSIS ON THE MEAN
OR ON THE  N+1ST  OBSERVATION.  IN OTHER WORDS, YOU CAN SEE
WHAT YOU EXPECT ADVERSARY TO BELIEVE ABOUT THE MEAN OR THE
NEXT OBSERVATION AFTER HE HAS ALREADY MADE N OBSERVATIONS.

PREPOSTERIOR ON:  MEAN=1    N+1ST OBSERVATION=2    OR  EXIT=3?2

INPUT THE PARAMETERS OF YOUR  PRIOR MARGINAL DISTRIBUTION ON THE
MEAN.

INPUT THE DEGREES OF FREEDOM.?7
INPUT THE MEAN.?10
INPUT THE SCALE PARAMETER.?31.73

INPUT THE SCALE PARAMETER OF YOUR PRIOR MARGINAL DISTRIBUTION
ON THE STANDARD DEVIATION.?12.59

INPUT THE PARAMETERS OF THE ADVERSARY MARGINAL PRIOR
DISTRIBUTION ON THE MEAN.

INPUT THE DEGREES OF FREEDOM.?10
INPUT THE MEAN.?8
INPUT THE SCALE PARAMETER.?15

INPUT THE SCALE PARAMETER OF THE PRIOR MARGINAL DISTRIOBUTION
ON THE STANDARD DEVIATION.?12.59
```

```
THE MODULE WILL DISPLAY THE MEAN AND STANDARD DEVIATION OF
THE PREPOSTERIOR DISTRIBUTION FOR A GIVEN SAMPLE SIZE.
YOU CAN SPECIFY AS MANY AS 5 DIFFERENT SAMPLE SIZES.

INPUT THE NUMBER OF SAMPLE SIZES YOU WANT TO CONSIDER.?4
INPUT SAMPLE SIZE. (MIN=3)?5
INPUT SAMPLE SIZE. (MIN=3)?10
INPUT SAMPLE SIZE. (MIN=3)?20
INPUT SAMPLE SIZE. (MIN=3)?40
```

```
HERE ARE THE MEANS AND STANDARD DEVIATIONS OF THE PREPOSTERIOR
DISTRIBUTIONS FOR DIFFERENT SAMPLE SIZES.

PREPOSTERIOR FOR N+1TH OBSERVATION

                          MEAN              STANDARD DEVIATION
YOUR PRIOR               10.00                 6.17
ADVERSARY PRIOR           8.00                 4.66
-----------------------------------------------------------------
PREPOSTERIOR
   N =     5              8.64                 5.09
   N =    10              8.97                 5.42
   N =    20              9.31                 5.70
   N =    40              9.58                 5.90

IF YOU WANT TO CONSIDER OTHER N VALUES TYPE '1', ELSE '0'.?0
```

```
YOU CAN NOW LOOK IN MORE DETAIL AT THE PREPOSTERIOR
DISTRIBUTION FOR ANY N YOU WANT.

IF YOU WANT TO DO THIS TYPE THE VALUE OF N, ELSE '0'.?20
```

```
THE PREPOSTERIOR DISTRIBUTION  CAN BE APPROXIMATED
BY A T-DISTRIBUTION WITH THESE PARAMETERS.


PREPOSTERIOR ON THE N+1TH OBSERVATION

DEGREES OF FREEDOM =    7.14    MEAN =       9.31
SCALE PARAMETER=     167.29

HERE ARE SOME OF THE CHARACTERISTICS OF THIS DISTRIBUTION.

          5.87     50% HDR         12.75
          3.25     75% HDR         15.37
          0.16     90% HDR         18.45
         -2.09     95% HDR         20.71
         -7.57     99% HDR         26.18

IF YOU WANT THE PROBABILITY LESS THAN SOME VALUE TYPE THE
VALUE (EXIT= -7777).?10
                              PROB LESS THAN       10.00 =0.55
NEXT VALUE OR '-7777'?-7777
```

```
IF YOU WANT TO TRY A DIFFERENT N TYPE THE VALUE, ELSE '0'.?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
PREPOSTERIOR ON:  MEAN=1    N+1ST OBSERVATION=2    OR  EXIT=3?3
```

TWO PARAMETER NORMAL (NATURAL CONJUGATE PRIORS)

1. PRIOR DISTRIBUTION ON STANDARD DEVIATION (SIGMA)
2. PRIOR DISTRIBUTION ON MEAN (MU)
3. ADVERSARY PREPOSTERIOR ANALYSIS
4 CONSENSUS PREPOSTERIOR ANALYSIS
5. POSTERIOR DISTRIBUTIONS ON MU AND SIGMA

* NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?4

CONSENSUS PREPOSTERIOR

IF YOU DON'T YET HAVE THE PARAMETERS OF THE PRIOR MARGINAL DISTRIBUTIONS ON THE MEAN AND STANDARD DEVIATION FOR BOTH INVESTIGATOR AND ADVERSARY, USE THE TWO PARAMETER NORMAL MODEL OF THE CADA MONITOR TO OBTAIN THESE.

IF YOU WANT

TO CONTINUE THE PREPOSTERIOR ANALYSIS TYPE '1'
TO EXIT THIS MODULE TO OBTAIN THESE PARAMETER TYPE '0'
?1

```
INPUT THE PARAMETERS OF THE INVESTIGATOR'S PRIOR MARGINAL DISTRI-
BUTIONS ON THE MEAN AND THE STANDARD DEVIATION OF THE NORMAL
DISTRIBUTION.

FROM THE PRIOR ON THE STANDARD DEVIATION:

ENTER MODAL ESTIMATE OF STANDARD DEVIATION.?5
ENTER DEGREES OF FREEDOM?7

FROM THE PRIOR ON THE MEAN:

ENTER POINT ESTIMATE OF THE MEAN?10
ENTER STANDARD DEVIATION OF T DISTRIBUTION ON MEAN.?2.24
```

```
INPUT THE PARAMETERS OF THE ADVERSARY'S PRIOR MARGINAL DISTRIBU-
TIONS ON THE MEAN AND THE STANDARD DEVIATION OF THE NORMAL
DISTRIBUTION.

FROM THE PRIOR ON THE STANDARD DEVIATION:

ENTER MODAL ESTIMATE OF STANDARD DEVIATION.?5
ENTER DEGREES OF FREEDOM?10

FROM THE PRIOR ON THE MEAN:

ENTER POINT ESTIMATE OF THE MEAN.?8
ENTER STANDARD DEVIATION OF T DISTRIBUTION ON MEAN.?3
```

```
INPUT P FOR THE P% SMALLEST CONSENSUS CREDIBILITY INTERVAL-SCCI
?50

ENTER THE SAMPLE SIZE FOR THE EXPECTED LENGTH OF THE POSTERIOR
CONSENSUS HIGHEST DENSITY REGION, YOU MAY ENTER N=0 FOR THE
'PRIOR' SCCI.

ENTER SAMPLE SIZE N=?0

SAMPLE SIZE N= 0       P% PERCENTILE  P= 50

LOWER ENDPOINT OF SCCI IS  6.45385     UPPER ENDPOINT IS  10.2341
LENGTH OF INTERVAL IS  3.78029

IF YOU WISH TO EVALUATE WITH ANOTHER SAMPLE SIZE TYPE '1'
            TO EVALUATE WITH ANOTHER PERCENTILE  TYPE '2'
            TO  EXIT THE MODULE                  TYPE '3'
?1

ENTER SAMPLE SIZE N=?20

PLEASE BE PATIENT SINCE REACHING A CONSENSUS OFTEN TAKES A WHILE.
```

```
SAMPLE SIZE N= 20      P% PERCENTILE  P= 50
EXPECTED LENGTH OF THE REGION IS  2.107


IF YOU WISH TO EVALUATE WITH ANOTHER SAMPLE SIZE TYPE '1'
            TO EVALUATE WITH ANOTHER PERCENTILE  TYPE '2'
            TO  EXIT THE MODULE                  TYPE '3'
?3
```

```
     TWO PARAMETER NORMAL (NATURAL CONJUGATE PRIORS)

     1. PRIOR DISTRIBUTION ON STANDARD DEVIATION (SIGMA)
     2. PRIOR DISTRIBUTION ON MEAN (MU)
     3. ADVERSARY PREPOSTERIOR ANALYSIS
     4  CONSENSUS PREPOSTERIOR ANALYSIS
     5. POSTERIOR DISTRIBUTIONS ON MU AND SIGMA

     * NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?5
```

POSTERIOR ANALYSIS FOR THE TWO PARAMETER NORMAL MODEL

HOW MANY OBSERVATIONS ARE THERE IN YOUR SAMPLE ?30

WHAT IS THE MEAN OF YOUR SAMPLE ?12

WHAT IS THE STANDARD DEVIATION OF YOUR SAMPLE ?4

THE JOINT POSTERIOR MODE FOR THE POPULATION MEAN AND STANDARD DEVIATION IS THE POINT ON THE PLANE AROUND WHICH THE PROBABILITY IS MOST HIGHLY CONCENTRATED. HERE IS THE JOINT MODE FOR YOUR POSTERIOR DISTRIBUTION.

MEAN	11.71
STANDARD DEVIATION	4.10

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1

*** SUMMARY OF ANALYSIS ON THE STANDARD DEVIATION ****

MARGINAL INVERSE CHI DISTRIBUTIONS

	PRIOR			POSTERIOR		
DEGREES OF FREEDOM		7.00			37.00	
SCALE PARAMETER		12.59			25.61	
MEAN		5.37			4.30	
MODE		4.45			4.15	
MEDIAN		5.00			4.25	
50% HDR	3.72	TO	5.46	3.85	TO	4.51
75% HDR	3.32	TO	6.40	3.65	TO	4.79
95% HDR	2.80	TO	8.72	3.35	TO	5.33

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1

********* SUMMARY OF ANALYSIS ON THE MEAN ************

MARGINAL STUDENT'S DISTRIBUTIONS

	PRIOR			POSTERIOR		
DEGREES OF FREEDOM		7.00			37.00	
SCALE PARAMETER		31.73			18.74	
MEDIAN		10.00			11.71	
50% HDR	8.49	TO	11.51	11.23	TO	12.20
75% HDR	7.33	TO	12.67	10.88	TO	12.55
95% HDR	4.96	TO	15.04	10.27	TO	13.16

TYPE THE NUMBER OF OPTIONS YOU WANT
1. EVALUATE THE POSTERIOR ON THE MEAN.
2. EVALUATE THE POSTERIOR ON ST. DEV.
3. EXIT THE MODULE.

?1

EVALUATION OF A STUDENT'S T DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A STUDENT'S T DISTRIBUTION.

TYPE THE NUMBER OF THE OPTION YOU WANT.
1. PERCENTILES
2. HIGHEST DENSITY REGIONS
3. PROBABILITIES T IS ABOVE AND BELOW SOME VALUE
4. PROBABILITY T IS BETWEEN TWO VALUES
5. PERCENTILES FOR TRUNCATED T DISTRIBUTION
6. GRAPH OF THE DENSITY FUNCTION
7. END EVALUATION OF T DISTRIBUTION

?1

OPTION 1: PERCENTILES

TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT PROBABILITY AS PERCENTAGE FROM .5 THROUGH 99.5.

```
-------------------------------------------------------------
                STUDENT'S T DISTRIBUTION
DEGREES OF FREEDOM =    37.00                 MEAN =    11.71
SCALE PARAMETER    =    18.74   STANDARD DEVIATION =     0.73
-------------------------------------------------------------
INPUT % PROBABILITY
?50
                          50.00 PERCENTILE =   11.71
INPUT % PROBABILITY
?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. END EVALUATION OF THIS DISTRIBUTION
?2
```

```
TYPE THE NUMBER OF OPTIONS YOU WANT
   1.  EVALUATE THE POSTERIOR ON THE MEAN.
   2.  EVALUATE THE POSTERIOR ON ST. DEV.
   3.  EXIT THE MODULE.
?3
```

```
TWO PARAMETER NORMAL (NATURAL CONJUGATE PRIORS)

     1. PRIOR DISTRIBUTION ON STANDARD DEVIATION (SIGMA)
     2. PRIOR DISTRIBUTION ON MEAN (MU)
     3. ADVERSARY PREPOSTERIOR ANALYSIS
     4  CONSENSUS PREPOSTERIOR ANALYSIS
     5. POSTERIOR DISTRIBUTIONS ON MU AND SIGMA

     * NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0
```

```
COMPONENT 22. UNIVARIATE NORMAL MODELS

     1. TWO PARAMETER NORMAL(NATURAL CONJUGATE PRIORS)
     2. COMPARISON OF TWO NORMAL MEANS
     3. COMPARISON OF TWO STANDARD DEVIATIONS

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?2
```

```
COMPARISON OF TWO NORMAL MEANS

  1. INDEPENDENT 'T' POSTERIOR DISTRIBUTIONS
 *2. DEPENDENT 'T' POSTERIOR DISTRIBUTIONS

  * NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1
```

```
                  COMPARISON OF NORMAL MEANS

THIS PROGRAM ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF THE
POSTERIOR BEHRENS-FISHER DISTRIBUTION ON THE DIFFERENCE OF TWO
NORMAL MEANS.  YOU NEED TO KNOW THE PARAMETERS OF THE MARGINAL
POSTERIOR T-DISTRIBUTIONS ON THE TWO MEANS.  IF YOU DO NOT KNOW
THESE THEY CAN BE OBTAINED BY DOING TWO SEPARATE TWO-PARAMETER
NORMAL ANALYSES.

IF YOU KNOW THE PARAMETERS AND WANT TO PROCEED TYPE '1'.
IF YOU WANT TO EXIT MODULE                     TYPE '0'.
?1
```

```
EVALUATION OF BEHRENS-FISHER DISTRIBUTION

 THE BEHRENS-FISHER DISTRIBUTION IS DEFINED AS THE DISTRIBUTION
OF THE QUANTITY  T1 - T2  WHERE T1 AND T2 HAVE T-DISTRIBUTIONS
WITH PARAMETERS (NU1,M1,K1) AND (NU2,M2,K2) RESPECTIVELY.

 THERE ARE TWO WAYS TO SPECIFY THE BEHRENS-FISHER DISTRIBUTION:

(1) TO INPUT (NU1,M1,K1) AND (NU2,M2,K2) , WHERE
   NU1  AND  NU2  ARE THE DEGREES OF FREEDOM (D.F.) ,
   M1   AND  M2   ARE THE MEANS ,AND
   K1   AND  K2   ARE THE SCALE PARAMETERS OF EACH T-DISTRIBUTION.
      SCALE PARAMETER := VARIANCE  X  ( D.F. - 2)

(2) TO INPUT (PSY,NU1,NU2,EPSILON,ZETA) , WHERE
   PSY := ARCTANGENT OF SQUARE ROOT OF ( (NU2 X K1)/(NU1 X K2) )
          --- IN DEGREES ---
   EPSILON := SQUARE ROOT OF ( (K1/NU1) + (K2/NU2) )
   ZETA := M1 - M2

WHICH WAY DO YOU PREFER, (1) OR (2) ?1

INPUT NU1 (DEGREES OF FREEDOM OF THE 1ST T-DISTRIBUTION)?15
INPUT M1  (MEAN OF THE 1ST T-DISTRIBUTION)?10
INPUT K1  (SCALE PARAMETER OF THE 1ST T-DISTRIBUTION)?15

INPUT NU2 (DEGREES OF FREEDOM OF THE 2ND T-DISTRIBUTION)?20
INPUT M2  (MEAN OF THE 2ND T-DISTRIBUTION)?8
INPUT K2  (SCALE PARAMETER OF THE 2ND T-DISTRIBUTION)?10
```

```
TYPE THE NUMBER OF OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUNCTION
     6. EXIT
?3
```

```
        OPTION 3: PROBABILITY LESS THAN SOME VALUE
TO EXIT ROUTINE TYPE '-7777' WHEN ASKED FOR INPUT.
-------------------------------------------------------
                BEHRENS-FISHER DISTRIBUTION
-------------------------------------------------------
NU1=  15.00     NU2=  20.00     PSI=54.74 DEGREES
EPSILON (SCALE) =    1.225      ZETA (MEAN) =  2.00
STANDARD DEVIATION=    1.314        ( M1 - M2 )
-------------------------------------------------------
-------------------------------------------------------
INPUT X?0
                     PROB ( BF <     0.00 ) =0.06
                     PROB ( BF >     0.00 ) =0.94
INPUT X?2
                     PROB ( BF <     2.00 ) =0.50
                     PROB ( BF >     2.00 ) =0.50
INPUT X?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE A DIFFERENT BEHRENS-FISHER DISTRIBUTION
     3. EXIT MODULE
?3
```

```
     COMPARISON OF TWO NORMAL MEANS

     1. INDEPENDENT 'T' POSTERIOR DISTRIBUTIONS
    *2. DEPENDENT 'T' POSTERIOR DISTRIBUTIONS

     * NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0
```

COMPONENT 22. UNIVARIATE NORMAL MODELS

1. TWO PARAMETER NORMAL(NATURAL CONJUGATE PRIORS)
2. COMPARISON OF TWO NORMAL MEANS
3. COMPARISON OF TWO STANDARD DEVIATIONS

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?3

COMPARISON OF TWO STANDARD DEVIATIONS

1. INDEPENDENT INVERSE CHI DISTRIBUTED ST. DEVIATIONS
*2. NON-INDEPENDENTLY DISTRIBUTED ST. DEVIATIONS

* NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1

COMPARISON OF TWO STANDARD DEVIATIONS

THIS MODULE COMPUTES THE PROBABILITY THAT THE RATIO OF TWO STANDARD DEVIATIONS DISTRIBUTED AS INDEPENDENT INVERSE CHIS IS GREATER THAN K, WHERE K CAN TAKE ON ANY POSITIVE VALUE.

INPUT THE PARAMETERS OF THE INVERSE CHI DISTRIBUTION ON THE FIRST STANDARD DEVIATION.

```
INPUT THE DEGREES OF FREEDOM.?15
INPUT THE SCALE PARAMETER.?15
```

INPUT THE PARAMETERS OF THE SECOND INVERSE CHI DISTRIBUTION.

```
INPUT THE DEGREES OF FREEDOM?20
INPUT THE SCALE PARAMETER.?10
```

THIS MODULE COMPUTES AND PRINTS THE PROBABILITY THAT THE RATIO

```
            -----------------
            SIGMA-1 / SIGMA-2
            -----------------
```

IS GREATER THAN K, WHERE K CAN TAKE ON ANY POSITIVE VALUE. THIS RATIO WAS CHOSEN BECAUSE FOR THE MODAL ESTIMATES OF THE STANDARD DEVIATIONS THIS RATIO IS GREATER THAN 1.

YOU CAN SPECIFY UP TO 6 DIFFERENT VALUES AT A TIME. AFTER THE PROBABILITIES FOR THESE K VALUES HAVE BEEN COMPUTED AND PRINTED YOU ARE GIVEN THE OPPORTUNITY TO SPECIFY MORE.

```
HOW MANY K VALUES DO YOU WANT TO SPECIFY?5
INPUT VALUE  1   ?.5
INPUT VALUE  2   ?1
INPUT VALUE  3   ?1.5
INPUT VALUE  4   ?2
INPUT VALUE  5   ?4
```

```
          COMPARISON OF TWO STANDARD DEVIATIONS
  SIGMA-1          INVERSE CHI DISTRIBUTIONS          SIGMA-2
==============================================================
   15.00              DEGREES OF FREEDOM               20.00
   15.00                SCALE PARAMETER                10.00
    4.08                    MEAN                        2.32
    3.75                    MODE                        2.18
==============================================================
           PROB( SIGMA-1/SIGMA-2  >   0.50 ) =1.00
           PROB( SIGMA-1/SIGMA-2  >   1.00 ) =0.98
           PROB( SIGMA-1/SIGMA-2  >   1.50 ) =0.71
           PROB( SIGMA-1/SIGMA-2  >   2.00 ) =0.27
           PROB( SIGMA-1/SIGMA-2  >   4.00 ) =0.00
==============================================================
WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
   1. FURTHER EVALUATE THIS RATIO
   2. EVALUATE A DIFFERENT RATIO
   3. EXIT MODULE
?3
```

COMPARISON OF TWO STANDARD DEVIATIONS

1. INDEPENDENT INVERSE CHI DISTRIBUTED ST. DEVIATIONS
*2. NON-INDEPENDENTLY DISTRIBUTED ST. DEVIATIONS

* NOT YET AVAILABLE

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0

COMPONENT 22. UNIVARIATE NORMAL MODELS

1. TWO PARAMETER NORMAL(NATURAL CONJUGATE PRIORS)
2. COMPARISON OF TWO NORMAL MEANS
3. COMPARISON OF TWO STANDARD DEVIATIONS

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?0

COMPONENT GROUP 2. SIMPLE BAYESIAN PARAMETRIC MODELS

21. BINARY MODELS
22. UNIVARIATE NORMAL MODELS
23. MULTI-CATEGORY MODELS
24. SIMPLE LINEAR REGRESSION ANALYSIS
25. MULTIPLE LINEAR REGRESSION ANALYSIS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?23

COMPONENT 23. MULTI-CATEGORY MODELS

1. MULTINOMIAL MODEL (DIRICHLET PRIOR)

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?1

```
MULTINOMIAL MODEL (DIRICHLET PRIOR)

    1.  PRIOR DISTRIBUTION
    2.  POSTERIOR DISTRIBUTION

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1
```

```
     PRIOR DISTRIBUTION - MULTINOMIAL MODEL

THIS MODULE WILL ASSIST YOU IN FITTING A PRIOR DISTRIBUTION TO
YOUR BELIEFS ABOUT THE PROPORTIONS IN A MULTINOMIAL ANALYSIS.
THE MODULE ATTEMPTS TO FIT A DIRICHLET DISTRIBUTION TO YOUR
BELIEFS ABOUT THE PROPORTIONS CONSIDERED JOINTLY, AND BETA
DISTRIBUTIONS TO YOUR BELIEFS ABOUT THE PROPORTIONS CONSIDERED
SEPARATELY.  THERE CAN BE AS MANY AS 10 CATEGORIES.

HOW MANY CATEGORIES ARE THERE IN YOUR ANALYSIS?4

INPUT YOUR ESTIMATES OF THE PROPORTION OF THE POPULATION IN
EACH CATEGORY.  THESE ESTIMATES SHOULD SUM TO 1.0

CATEGORY  1    ?.2

CATEGORY  2    ?.3
                          ACCUMULATED PROPORTION = 0.50
CATEGORY  3    ?.35
                          ACCUMULATED PROPORTION = 0.85
CATEGORY  4    ?.15
```

SPECIFY THE 25TH AND 75TH PERCENTILES OF YOUR PRIOR DISTRIBUTION ON THE PROPORTION IN EACH OF THE CATEGORIES. WE ARE ASSUMING YOUR ESTIMATE WAS A MEASURE OF THE CENTRAL TENDENCY OF THE PRIOR DISTRIBUTION.

CATEGORY	ESTIMATE	25TH & 75TH
1	0.20	?.15,.35
2	0.30	?.2,.4
3	0.35	?.25,.4
4	0.15	?.05,.2

HERE ARE THE PERCENTILES OF THE MARGINAL BETA DISTRIBUTIONS FITTED TO YOUR SPECIFICATIONS.

HYPOTHETICAL SAMPLE SIZE (A) = 16.82

CATEGORY	JOINT ESTIMATE	25TH	50TH	75TH
1	.20	.13	.19	.27
2	.30	.21	.29	.36
3	.35	.26	.33	.41
4	.15	.10	.15	.21

IF YOU DO NOT FEEL THAT THE HYPOTHETICAL SAMPLE SIZE (A) REFLECTS YOUR PRIOR INFORMATION ABOUT THE PROPORTIONS YOU CAN SPECIFY A DIFFERENT (A). THIS WILL NOT AFFECT THE JOINT ESTIMATE BUT WILL CHANGE THE MARGINAL PERCENTILES. A LARGER (A) WILL RESULT IN SMALLER INTERPERCENTILE DIFFERENCES AND A SMALLER (A) IN LARGER ONES.

IF YOU WANT TO CHANGE (A) TYPE NEW VALUE ELSE '0'.?12

HERE ARE THE PERCENTILES OF THE MARGINAL BETA DISTRIBUTIONS FITTED TO YOUR SPECIFICATIONS.

HYPOTHETICAL SAMPLE SIZE (A) = 12.00

CATEGORY	JOINT ESTIMATE	25TH	50TH	75TH
1	.20	.12	.19	.28
2	.30	.20	.28	.37
3	.35	.24	.32	.42
4	.15	.09	.15	.23

IF YOU WANT TO CHANGE (A) TYPE NEW VALUE ELSE '0'.?0

HERE ARE SOME OF THE CHARACTERISTICS OF THE PRIOR DIRICHLET DISTRIBUTION FITTED TO YOUR PRIOR BELIEFS. YOU MAY WISH TO RECORD THE PARAMETER(P) FOR THE POSTERIOR ANALYSIS.

HYPOTHETICAL SAMPLE SIZE (A)= 12.00

		JOINT		MARGINAL PERCENTILES				
CATEGORY	P	MEAN	MODE	10TH	25TH	50TH	75TH	90TH
1	2.50	.21	.19	.08	.12	.19	.28	.36
2	3.50	.29	.31	.14	.20	.28	.37	.46
3	4.00	.33	.38	.17	.24	.32	.42	.51
4	2.00	.17	.13	.05	.09	.15	.23	.31

* P VALUES DENOTE PARAMETERS OF THE DIRICHLET PRIOR

TYPE THE NUSMBER OF OPTION YOU WANT
1. TO GO TO THE POSTERIOR ANALYSIS
2. TO CHANGE HYPOTHETICAL SAMPLE SIZE
3. TO CHANGE THE DIRICHLET PRIOR
4. TO EXIT THE MODULE

?1

POSTERIOR ANALYSIS-MULTINOMIAL MODEL

THIS MODULES COMPUTES THE JOINT AND MARGINAL POSTERIOR DISTRIBUTIONS FOR THE PROPORTIONS.

ENTER THE NUMBER OF OBSERVATIONS IN EACH CATEGORY.

CATEGORY 1?6

CATEGORY 2?10

CATEGORY 3?10

CATEGORY 4?5

HERE IS WHAT YOU ENTERED.

CATEGORY	1	6
CATEGORY	2	10
CATEGORY	3	10
CATEGORY	4	5

IF YOU WANT TO CONTINUE THE POSTERIOR ANALYSIS TYPE '1'

TO CHANGE THE SAMPLE DATA TYPE '2'

?1

SUMMARY OF POSTERIOR DISTRIBUTIONS

		JOINT		MARGINAL PERCENTILES				
CATEGORY	P*	MEAN	MODE	10TH	25TH	50TH	75TH	90TH
1	8.50	.20	.19	.12	.15	.19	.24	.28
2	13.50	.31	.32	.23	.26	.31	.36	.41
3	14.00	.33	.33	.24	.28	.32	.37	.42
4	7.00	.16	.15	.09	.12	.16	.20	.24

* P VALUES DENOTE PARAMETERS OF THE DIRICHLET DIST.

THIS COMPLETES THE MULTINOMIAL ANALYSIS.

WHEN YOU ARE READY TO CONTINUE TYPE '1'

?1

```
     MULTINOMIAL MODEL (DIRICHLET PRIOR)

     1.  PRIOR DISTRIBUTION
     2.  POSTERIOR DISTRIBUTION

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1
```

```
      PRIOR DISTRIBUTION - MULTINOMIAL MODEL

THIS MODULE WILL ASSIST YOU IN FITTING A PRIOR DISTRIBUTION TO
YOUR BELIEFS ABOUT THE PROPORTIONS IN A MULTINOMIAL ANALYSIS.
THE MODULE ATTEMPTS TO FIT A DIRICHLET DISTRIBUTION TO YOUR
BELIEFS ABOUT THE PROPORTIONS CONSIDERED JOINTLY, AND BETA
DISTRIBUTIONS TO YOUR BELIEFS ABOUT THE PROPORTIONS CONSIDERED
SEPARATELY.  THERE CAN BE AS MANY AS 10 CATEGORIES.

HOW MANY CATEGORIES ARE THERE IN YOUR ANALYSIS?4

INPUT YOUR ESTIMATES OF THE PROPORTION OF THE POPULATION IN
EACH CATEGORY.  THESE ESTIMATES SHOULD SUM TO 1.0

CATEGORY  1    ?.2

CATEGORY  2    ?.3
                                ACCUMULATED PROPORTION = 0.50
CATEGORY  3    ?.35
                                ACCUMULATED PROPORTION = 0.85
CATEGORY  4    ?.15
```

COMPONENT GROUP 2. SIMPLE BAYESIAN PARAMETRIC MODELS

21. BINARY MODELS
22. UNIVARIATE NORMAL MODELS
23. MULTI-CATEGORY MODELS
24. SIMPLE LINEAR REGRESSION ANALYSIS
25. MULTIPLE LINEAR REGRESSION ANALYSIS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?24

COMPONENT 24. SIMPLE LINEAR REGRESSION ANALYSIS

1. SIMPLE LINEAR REGRESSION MODEL

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0').?1

```
BAYESIAN REGRESSION (INFORMATIVE PRIORS)

     1. ASSESSMENT OF A PRIOR DISTRIBUTION
     2. POSTERIOR ANALYSIS

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER ( ELSE '0' ).?1
```

```
SPECIFICATION OF A PRIOR FOR SIMPLE LINEAR REGRESSION

THIS MODULE WILL ASSIST YOU IN FITTING A PRIOR DISTRIBUTION
TO YOUR BELIEFS ABOUT THE PARAMETERS OF THE SIMPLE  LINEAR
REGRESSION MODEL.

VARIABLES:        X = PREDICTOR OR INDEPENDENT VARIABLE.
                  Y = CRITERION OR DEPENDENT VARIABLE.

MODEL: Y GIVEN X IS NORMALLY DISTRIBUTED WITH

         MEAN = ALPHA + BETA*(X-M),  WHERE M IS MEAN OF X
         ST. DEV. = SIGMA

PARAMETERS: ALPHA = Y AT THE MEAN OF X
            BETA  = SLOPE OF THE REGRESSION LINE
            SIGMA = RESIDUAL STANDARD DEVIATION

THE X VALUES MAY BE FIXED OR RANDOMLY SAMPLED.  IF SAMPLED,
THIS MAY BE SEPARATE FROM, OR JOINTLY WITH Y.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'?1
```

```
THE FIRST STEP IN THE SPECIFICATION OF A PRIOR CONSISTS
OF FITTING A LINE TO YOUR BEST ESTIMATES OF Y GIVEN X
FOR SEVERAL DIFFERENT VALUES OF X.

LET X2 BE THE VALUE OF X FOR WHICH YOU FEEL MOST CONFIDENT
EXPRESSING YOUR BELIEFS ABOUT Y GIVEN X.
X2 =?20

LET X1 BE THE SMALLEST VALUE OF X FOR WHICH YOU FEEL YOU CAN
EXPRESSING YOUR BELIEFS ABOUT Y GIVEN X.
X1 =?10

LET X3 BE THE LARGEST VALUE OF X FOR WHICH YOU FEEL COMFORTABLE
EXPRESSING YOUR BELIEFS ABOUT Y GIVEN X.
X3 =?30
```

```
THESE THREE VALUES OF X WILL SERVE AS REFERENCE POINTS IN
OBTAINING YOUR BEST ESTIMATE OF THE TRUE REGRESSION LINE.

           X1 =        10.00
           X2 =        20.00
           X3 =        30.00

NOW PLEASE GIVE YOUR BEST ESTIMATE OF Y FOR EACH OF THESE
VALUES OF X.

    X                      BEST ESTIMATE OF Y
   10                              ?1.1
   20                              ?1.9
   30                              ?2.9
```

YOUR PRIOR DISTRIBUTION ON Y GIVEN X IS ASSUMED TO BE SYMMETRIC ABOUT YOUR BEST ESTIMATE OF Y. YOUR BEST ESTIMATE IS TAKEN AS THE 50TH PERCENTILE OF YOUR PRIOR.

A FURTHER ASSUMPTION IS THAT THE CLOSER X IS TO X2 THE SMALLER IS THE ABSOLUTE DIFFERENCE BETWEEN THE 50TH AND 75TH PERCENTILES OF YOUR PRIOR DISTRIBUTION ON Y GIVEN X.

INPUT THE 75TH PERCENTILE OF YOUR PRIOR DISTRIBUTION ON Y GIVEN EACH OF THE FOLLOWING X VALUES.

X2 = 20

X	50TH	75TH
20.00	1.90	?2.2
10.00	1.10	?1.5
30.00	2.90	?3.4

HERE ARE PERCENTILES OF POSSIBLE DISTRIBUTIONS FITTED TO YOUR SPECIFIED PERCENTILES.

	Y GIVEN X				
X	FITTED 25TH	SPECIFIED 50TH	FITTED 50TH	SPECIFIED 75TH	FITTED 75TH
10.00	0.63	1.10	1.06	1.50	1.49
20.00	1.65	1.90	1.95	2.20	2.25
30.00	2.40	2.90	2.84	3.40	3.27

TYPE THE NUMBER OF OPTION YOU WANT
1. TO ACCEPT THE FITTED PERCENTILES AND CONTINUE.
2. TO CHANGE SOME OF THE SPECIFIED PERCENTILES.

?1

YOU HAVE GIVEN SUFFICIENT INFORMATION FOR CADA TO ESTIMATE THE PARAMETERS, ALPHA AND BETA, ON THE MEAN OF Y. TO FIT THE DISTRIBUTION FOR THE PARAMETER OF THE RESIDUAL STANDARD DEVIATION SIGMA, YOU ARE ASKED TO PROVIDE THE 75TH PERCENTILE OF THE DISTRIBUTION ON THE EXPECTATION OF Y GIVEN X.

THE MODEL ASSUMES THAT YOUR UNCERTAINTY ABOUT Y GIVEN X HAS TWO COMPONENTS. FIRST, YOU ARE NOT SURE WHAT THE EXPECTATION OF Y GIVEN X IS, AND SECOND, THE UNCERTAINTY, THE RESIDUAL UNCERTAINTY, THAT WOULD BE THERE EVEN IF YOU KNEW THE EXPECTATION OF Y GIVEN X.

THE 50TH PERCENTILES OF YOUR PRIOR DISTRIBUTIONS ON Y GIVEN X AND THE EXPECTATION OF Y GIVEN X ARE ASSUMED TO BE EQUAL. HOWEVER, SINCE YOUR UNCERTAINTY ABOUT Y INCLUDES YOUR UNCERTAINTY ABOUT THE EXPECTATION OF Y, THE 75TH PERCENTILE OF YOUR PRIOR DISTRIBUTION ON Y GIVEN X IS ASSUMED TO BE GREATER THAN THE 75TH PERCENTILE OF YOUR PRIOR DISTRIBUTION ON THE EXPECTATION OF Y GIVEN X.

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

HERE ARE THE 50TH AND 75TH PERCENTILES OF YOUR PRIOR ON THE Y GIVEN X2 = 20

50TH = 1.95 75TH = 2.25

YOU ARE NOW ASKED TO ENTER THE 75TH PERCENTILE OF YOUR PRIOR DISTRIBUTION ON THE EXPECTATION OF Y GIVEN X2.

IF YOU CHOOSE A NUMBER CLOSE TO 1.95 YOU WILL BE INDICATING YOU HAVE SMALL UNCERTAINTY OF THE EXPECTATION OF Y GIVEN X.

IF YOU CHOOSE A NUMBER CLOSE TO 2.25 YOU WILL BE INDICATING YOU HAVE LARGE UNCERTAINTY OF THE EXPECTATION OF Y GIVEN X.

ENTER YOUR 75TH PERCENTILE (GREATER THAN 1.95 AND LESS THAN 2.25)
?2.1

HERE ARE SOME PERCENTILES AND THE HYPOTHETICAL SAMPLE VALUE FOR YOUR PRIOR DISTRIBUTION ON THE EXPECTATION OF Y GIVEN X.

	EXPECTATION OF Y GIVEN X		
X	25TH	50TH	75TH
10.00	0.71	1.06	1.40
20.00	1.79	1.95	2.10
30.00	2.49	2.84	3.18

THE HYPOTHETICAL SAMPLE VALUE IS 2.83

THIS VALUE MEASURES THE STRENGTH OF YOUR PRIOR BELIEFS ABOUT ALPHA AND BETA RELATIVE TO INFORMATION FROM A HYPOTHETICAL PRIOR SAMPLE OF THIS SIZE.

```
IF YOU WANT TO CONTINUE THE ASSESSMENT               TYPE '1'
            TO CHANGE THE 75TH PERCENTILE FOR X2     TYPE '2'
            TO CHANGE THE HYPOTHETICAL SAMPLE SIZE   TYPE '3'
?3

PLEASE ENTER YOUR NEW HYPOTHETICAL SAMPLE SIZE?3
```

	EXPECTATION OF Y GIVEN X		
X	25TH	50TH	75TH
10.00	0.71	1.06	1.40
20.00	1.80	1.95	2.10
30.00	2.49	2.84	3.18

THE HYPOTHETICAL SAMPLE VALUE IS 3.00

THIS VALUE MEASURES THE STRENGTH OF YOUR PRIOR BELIEFS ABOUT ALPHA AND BETA RELATIVE TO INFORMATION FROM A HYPOTHETICAL PRIOR SAMPLE OF THIS SIZE.

```
IF YOU WANT TO CONTINUE THE ASSESSMENT               TYPE '1'
            TO CHANGE THE 75TH PERCENTILE FOR X2     TYPE '2'
            TO CHANGE THE HYPOTHETICAL SAMPLE SIZE   TYPE '3'
?1
```

HERE ARE THE 50TH, 75TH, 90TH, AND 95TH PERCENTILES OF DISTRIBUTIONS FITTED TO YOUR PERCENTILE SPECIFICATIONS FOR THE EXPECTATION OF Y GIVEN X2.

X2 = 20.00

EXPECTATION OF Y GIVEN X2

DF.	50TH	75TH	90TH	95TH	99TH
4	1.95	2.10	2.26	2.38	2.71
6	1.95	2.10	2.25	2.35	2.60
8	1.95	2.10	2.24	2.34	2.56
12	1.95	2.10	2.24	2.33	2.52
20	1.95	2.10	2.24	2.32	2.50
30	1.95	2.10	2.23	2.32	2.49

TYPE THE DEGREE OF FREEDOM OF THE DISTRIBUTION THAT BEST REPRESENTS YOUR BELIEFS ABOUT THE EXPECTATION OF Y GIVEN X2 (NONE=0). YOU MAY USE ONE OF THE SIX VALUES GIVEN ABOVE OR ANY INTEGER VALUE BETWEEN 4 AND 30.
?12

HERE ARE THE PARAMETERS OF YOUR PRIOR DISTRIBUTIONS, YOU MAY WISH TO RECORD THESE NUMBERS FOR THE POSTERIOR ANALYSIS.

	DEGREES OF FREEDOM	MEAN	SCALE PARAMETER
INVERSE CHI DISTRIBUTION			
RESIDUAL ST.DEV.	12	0.40	1.29
STUDENT'S T DISTRIBUTIONS			
MEAN OF Y AT X2= 20.00 (ALPHA)	12	1.95	0.56
SLOPE (BETA)	12	0.09	0.02

IF YOU WANT TO DO THE POSTERIOR ANALYSIS TYPE '1'
TO CHOOSE A DIFFERENT DISTRIBUTION TYPE '2'
TO EXIT THE MODULE TYPE '3'
?1

```
YOU NOW ARE REQUIRED TO INPUT THE INFORMATION OF THE
SAMPLE DATA

SAMPLE SIZE               =?105
MEAN OF PREDICTOR (X.) =?19.13
VARIANCE OF PREDICTOR  =?26.34
MEAN OF CRITERION (Y.) =?2.28
VARIANCE OF CRITERION  =?.8
CORRELATION COFFFICIENT=?.49
```

```
HERE ARE SOME CHARACTERISTICS OF THE POSTERIOR
DISTRIBUTION ON THE RESIDUAL STANDARD DEVIATION.

                 INVERSE CHI

       DEGREES OF FREEDOM =     117.00
         SCALE PARAMETER  =       8.123

         10TH PERCENTILE =       0.694
         25TH PERCENTILE =       0.721
         50TH PERCENTILE =       0.753
         75TH PERCENTILE =       0.788
         90TH PERCENTILE =       0.821

           0.716   50% HDR       0.782
           0.695   75% HDR       0.808
           0.661   95% HDR       0.855

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1
```

HERE ARE SOME CHARACTERISTICS OF THE POSTERIOR DISTRIBUTION ON THE SLOPE OF THE REGRESSION LINE.

STUDENT'S T DISTRIBUTION

DEGREES OF FREEDOM =		117.00
SCALE PARAMETER =		0.023
MEAN =		0.085
0.076	50% HDR	0.095
0.069	75% HDR	0.101
0.062	90% HDR	0.108
0.057	95% HDR	0.113
0.048	99% HDR	0.122

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

HERE ARE THE SUMMARY OF THE POSTERIOR DISTRIBUTIONS OF THE REGRESSION EQUATION. YOU MAY WANT TO RECORD THESE NUMBERS.

THE POSTERIOR DISTRIBUTION OF THE RESIDUAL VARIANCE IS AN INVERSE-CHI SQUARES WITH 117 DEGREES OF FREEDOM AND SCALE PARAMETER 65.99.

THE POSTERIOR DISTRIBUTION OF THE COEFFICIENTS IS A STUDENT'S T WITH

	MEAN	SACLE PARAMETER
INTERCEPT	0.64	9.08
SLOPE	0.09	0.02

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

EVALUATION OF POSTERIOR DISTRIBUTIONS

```
YOU HAVE THE FOLLOWING OPTIONS FOR EVALUATION OF POSTERIOR
DISTRIBUTIONS.

  1.  TO EVALUATE THE POSTERIOR PREDICTIVE DISTRIBUTION
  2.  TO EVALUATE THE POSTERIOR DISTRIBUTION ON MEAN OF Y
  3.  TO SAVE THE PARAMETERS OF REGRESSION EQUATION IN THE
      FILE FOR DECISION THEORY ANALYSIS
  4.  TO EXIT THE MODEL
?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. SPECIFIED PERCENTILES FOR SPECIFIED X VALUES
     2. SPECIFIED HDR'S FOR SPECIFIED X VALUES
     3. PROBABILITY  LESS THAN SPECIFIED VALUES FOR
        SPECIFIED X VALUES.
     4. PARAMETERS OF POSTERIOR PREDICTIVE DISTRIBUTIONS
     5. STOP EVALUATING THIS DISTRIBUTION
?3
```

```
OPTION 3:  PROBABILITY LESS THAN YO

YOU CAN SPECIFY FROM 1 THRU 4 DIFFERENT YO VALUES AND
FROM 1 THRU 10 DIFFERENT X VALUES.

INPUT THE NUMBER OF DIFFERENT YO VALUES.?4
INPUT YO.?1.5
INPUT YO.?2
INPUT YO.?2.5
INPUT YO.?3

INPUT THE NUMBER OF DIFFERENT X VALUES.?5
INPUT X.?15
INPUT X.?20
INPUT X.?25
INPUT X.?30
INPUT X.?35
```

```
OPTION 3: PROBABILITY LESS THAN YO.

POSTERIOR PREDICTIVE DISTRIBUTION ON Y GIVEN X

     X          1.50       2.00       2.50       3.00
-------------------------------------------------------
     15.00       0.29       0.54       0.78       0.92
     20.00       0.13       0.33       0.58       0.81
     25.00       0.05       0.16       0.36       0.62
     30.00       0.01       0.06       0.18       0.40
     35.00       0.00       0.02       0.08       0.22
-------------------------------------------------------
CHANGE ( YO VALUES=1  X VALUES=2  BOTH=3)  OR  EXIT=0  ?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. SPECIFIED PERCENTILES FOR SPECIFIED X VALUES
     2. SPECIFIED HDR'S FOR SPECIFIED X VALUES
     3. PROBABILITY  LESS THAN SPECIFIED VALUES FOR
        SPECIFIED X VALUES.
     4. PARAMETERS OF POSTERIOR PREDICTIVE DISTRIBUTIONS
     5. STOP EVALUATING THIS DISTRIBUTION
?5
```

```
            EVALUATION OF POSTERIOR DISTRIBUTIONS

YOU HAVE THE FOLLOWING OPTIONS FOR EVALUATION OF POSTERIOR
DISTRIBUTIONS.

  1.  TO EVALUATE THE POSTERIOR PREDICTIVE DISTRIBUTION
  2.  TO EVALUATE THE POSTERIOR DISTRIBUTION ON MEAN OF Y
  3.  TO SAVE THE PARAMETERS OF REGRESSION EQUATION IN THE
      FILE FOR DECISION THEORY ANALYSIS
  4.  TO EXIT THE MODEL
?2
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. SPECIFIED PERCENTILES FOR SPECIFIED X VALUES
     2. SPECIFIED HDR'S FOR SPECIFIED X VALUES
     3. PROBABILITY  LESS THAN SPECIFIED VALUES FOR
        SPECIFIED X VALUES.
     4. PARAMETERS OF POSTERIOR DISTRIBUTIONS
     5. STOP EVALUATING THIS DISTRIBUTION
?2
```

```
      OPTION 2: P% HDR'S FOR SPECIFIED X VALUES

YOU CAN SPECIFY 1 OR 2 DIFFERENT P% HDR'S AND FROM 1
THRU 10 DIFFERENT VALUES.

INPUT 1 OR 2 FOR THE NUMBER OF P% HDR'S.?2
INPUT P%.?75
INPUT P%.?95

INPUT THE NUMBER OF DIFFERENT X VALUES.?5
INPUT X.?15
INPUT X.?20
INPUT X.?25
INPUT X.?30
INPUT X.?35
```

P% HIGHEST DENSITY REGIONS

POSTERIOR DISTRIBUTION ON MEAN OF Y GIVEN X.

X		PX=75.0			PX=95.0
15.00 *	1.81	2.02 *	1.73	2.10
20.00 *	2.26	2.43 *	2.20	2.49
25.00 *	2.64	2.90 *	2.55	2.99
30.00 *	3.00	3.39 *	2.86	3.53
35.00 *	3.35	3.89 *	3.15	4.08

CHANGE(P% VALUES=1 X VALUES=2 BOTH=3) OR EXIT=0 ?0

TYPE THE NUMBER OF THE OPTION YOU WANT.

1. SPECIFIED PERCENTILES FOR SPECIFIED X VALUES
2. SPECIFIED HDR'S FOR SPECIFIED X VALUES
3. PROBABILITY LESS THAN SPECIFIED VALUES FOR SPECIFIED X VALUES.
4. PARAMETERS OF POSTERIOR DISTRIBUTIONS
5. STOP EVALUATING THIS DISTRIBUTION

?5

EVALUATION OF POSTERIOR DISTRIBUTIONS

YOU HAVE THE FOLLOWING OPTIONS FOR EVALUATION OF POSTERIOR DISTRIBUTIONS.

1. TO EVALUATE THE POSTERIOR PREDICTIVE DISTRIBUTION
2. TO EVALUATE THE POSTERIOR DISTRIBUTION ON MEAN OF Y
3. TO SAVE THE PARAMETERS OF REGRESSION EQUATION IN THE FILE FOR DECISION THEORY ANALYSIS
4. TO EXIT THE MODEL

?4

COMPONENT 24. SIMPLE LINEAR REGRESSION ANALYSIS

1. SIMPLE LINEAR REGRESSION MODEL

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0').?0

```
COMPONENT GROUP 2.  SIMPLE BAYESIAN PARAMETRIC MODELS

21.   BINARY MODELS
22.   UNIVARIATE NORMAL MODELS
23.   MULTI-CATEGORY MODELS
24.   SIMPLE LINEAR REGRESSION ANALYSIS
25.   MULTIPLE LINEAR REGRESSION ANALYSIS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?0
```

```
      COMPONENT GROUPS

1.    DATA MANAGEMENT FACILITY
2.    SIMPLE BAYESIAN PARAMETRIC MODELS
3.    DECISION THEORETIC MODELS
4.    BAYESIAN SIMULTANEOUS ESTIMATION
5.    BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.    BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.    ELEMENTARY CLASSICAL STATISTICS
8.    EXPLORATORY DATA ANALYSIS
9.    PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?1
```

```
COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12.  DATA MOVEMENT      ( INPUT/OUTPUT, EDITING )
13.  DATA TRANSFORMATIONS
14.  FILE MAINTENANCE  ( DATA GROUPING )

    * NOT YET AVAILABLE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?12
```

```
     COMPONENT 12.  DATA MOVEMENT

     1.  DATA ENTRY AND TRANSFERS
     2.  DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' )?1
```

```
MODEL 1.  DATA ENTRY AND TRANSFERS

     1.  DATA ENTRY FROM THE TERMINAL
     2.  DATA TRANSFER FROM DISK
     3.  DATA TRANSFER FROM THE CATALOG

     4.  DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER ( ELSE '0' )?3
```

```
        THE DATA FILE CATALOG

     1. ITBS SCORES, SCHOOL #1
     2. ITBS SCORES, SCHOOL #14
     3. ESAA PILOT PROGRAM
     4. IOWA COUNTY DATA
     5. SAMPLE REGRESSION DATA
     6. SAMPLE ANOVA DATA
     7. SAMPLE MANOVA DATA
     8. JUNIOR COLLEGE ACT SCORES

IF YOU WANT AN AVAILABLE DATA SET, TYPE ITS NUMBER ( ELSE '0' ).?5

TO TRANSFER THESE DATA TO YOUR WORK FILE, TYPE '1'.
TO OBTAIN A DESCRIPTION OF THESE DATA,    TYPE '2'.?1
```

```
THE DATA SET IS NOW IN THE PERSONAL FILE.  IT WILL REMAIN THERE
UNTIL YOU SIGN OFF THE MONITOR OR REPLACE IT WITH ANOTHER DATA
SET.

IF YOU WISH TO PROCEED TO AN ANALYSIS,     TYPE '1'.
IF YOU WISH TO REMAIN IN DATA MANAGEMENT, TYPE '2'.?1
```

```
     COMPONENT GROUPS

1.   DATA MANAGEMENT FACILITY
2.   SIMPLE BAYESIAN PARAMETRIC MODELS
3.   DECISION THEORETIC MODELS
4.   BAYESIAN SIMULTANEOUS ESTIMATION
5.   BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.   BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.   ELEMENTARY CLASSICAL STATISTICS
8.   EXPLORATORY DATA ANALYSIS
9.   PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?2
```

```
COMPONENT GROUP 2.  SIMPLE BAYESIAN PARAMETRIC MODELS

21.  BINARY MODELS
22.  UNIVARIATE NORMAL MODELS
23.  MULTI-CATEGORY MODELS
24.  SIMPLE LINEAR REGRESSION ANALYSIS
25.  MULTIPLE LINEAR REGRESSION ANALYSIS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?25
```

```
   COMPONENT 25.  MULTIPLE LINEAR REGRESSION ANALYSIS

      1. NONINFORMATIVE PRIORS
      2. INFORMATIVE PRIORS

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' ).?1
```

BAYESIAN REGRESSION (NON-INFORMATIVE PRIOR)

1. BAYESIAN REGRESSION ANALYSIS

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0').?1

HERE IS THE DATA SET YOU WILL DO THE POSTERIOR ANALYSIS.

DATA SET =COLDAT

GROUPS	1	COLL6	OBSERVATIONS = 25
	2	COLL7	25
	3	COLL8	25
	4	COLL9	25
	5	COLL10	25
	6	COLL11	25
	7	COLL12	25
	8	COLL13	25
	9	COLL15	25
	10	COLL19	25

TYPE THE NUMBER OF THE GROUP YOU WANT (NONE=0).?1

```
VARIABLES  1       ENGLSH
           2        MATH
           3       NATSCI
           4        GPA

TYPE THE VARIABLE NUMBER FOR THE DEPENDENT VARIABLE (NONE=0)?4

TYPE THE NUMBER OF INDEPENDENT VARIABLES IN THE REGRESSION
EQUATION (DO NOT CONSIDER THE INTERCEPT AS A SEPARATE VARIABLE)?2
TYPE THE VARIABLE NUMBERS FOR THE  2    INDEPENDENT VARIABLES
(SEPARATE BY COMMAS, IF MORE THAN 1 INDEPENDENT VARAIABLES).
?1,2
```

```
HERE ARE THE SUMMARY OF THE POSTERIOR DISTRIBUTION OF THE
REGRESSION EQUATION, YOU MAY WISH TO RECORD THESE NUMBERS.

THE POSTERIOR DISTRIBUTION OF THE VARIANCE OF THE ERROR
IS AN INVERSE CHI-SQUARE VARIABLE ON  22.00  DEGREES OF
FREEDOM WITH THE SCALE PARAMETER    12.80.

THE POSTERIOR DISTRIBUTION OF THE REGRESSION COEFFICIENTS
BETA IS A  3-VARIATE T VARIABLE WITH

                     MEAN
INTERCEPT      =     0.81
  ENGLSH       =     0.04
   MATH        =     0.03

            POSTERIOR COVARIANCE MATRIX

       0.431        -0.013        -0.013
      -0.013         0.001        -0.000
      -0.013        -0.000         0.001

WHEN YOU ARE READY TO CONTINUE                     TYPE '1'?1
```

```
YOU HAVE THE FOLLOWING AVAILABLE OPTIONS FOR EXAMINATION OF
THE POSTERIOR DISTRIBUTIONS OF  THE REGRSSION EQUATION.

   1. THE DISTRIBUTION OF THE VARIANCE OF THE ERROR.
   2. POSTERIOR ANALYSES OF THE REGRESSION COEFFICIENTS BETA.
   3. THE OBSERVED AND PREDICTED VALUES FOR YOUR DATA.
   4. PREDICTIVE DISTRIBUTION FOR CHOSEN PREDICTOR VALUES.
   5. TO SAVE THE PARAMETERS OF REGRESSION EQUATION IN THE
      FILE FOR DECISION THEORY ANALYSIS
   6. EXIT THE MODEL

TYPE THE NUMBER OF OPTIONS YOU WANT
?1
```

```
THE POSTERIOR DISTRIBUTION OF THE VARIANCE OF THE ERORR
IS AN INVESE CHI-SQUARE VARIABLE WITH  22.00  DEGREES OF
FREEDOM WITH THE SCALE PARAMETER  12.80

25TH PERCENTILE      =        0.49
50TH PERCENTILE      =        0.60
75TH PERCENTILE      =        0.74
50 PERCENT HDR          0.43 TO          0.67
75 PERCENT HDR          0.38 TO          0.79
95 PERCENT HDR          0.30 TO          1.06

WHEN YOU ARE READY TO CONTINUE             TYPE '1'?1
```

```
YOU HAVE THE FOLLOWING AVAILABLE OPTIONS FOR EXAMINATION OF
THE POSTERIOR DISTRIBUTIONS OF  THE REGRSSION EQUATION.

  1. THE DISTRIBUTION OF THE VARIANCE OF THE ERROR.
  2. POSTERIOR ANALYSES OF THE REGRESSION COEFFICIENTS BETA.
  3. THE OBSERVED AND PREDICTED VALUES FOR YOUR DATA.
  4. PREDICTIVE DISTRIBUTION FOR CHOSEN PREDICTOR VALUES.
  5. TO SAVE THE PARAMETERS OF REGRESSION EQUATION IN THE
     FILE FOR DECISION THEORY ANALYSIS
  6. EXIT THE MODEL

TYPE THE NUMBER OF OPTIONS YOU WANT
?2
```

```
THE JOINT POSTERIOR DISTRIBUTION OF THE COEFFICIENTS BETA IS
A 3-VARIATE T DISTRIBUTION WITH  22 DEGREES OF FREEDOM
AND THE FOLLOWING PARAMETERS:

          INTERCEPT   ENGLSH    MATH

  MEAN       0.81      0.04     0.03

          VARIANC/COVARIANCE MATRIX

       0.431      -0.013      -0.013
      -0.013       0.001      -0.000
      -0.013      -0.000       0.001

YOU MAY ALSO OBTAINED INFORMATION ABOUT THE DISTRIBUTION
OF THE COEFFICIENTS BY STUDYING THE JOINT HIGHEST DENSITY
REGIONS (HDR) OF THE MARGIANL DISTRIBUTION OF ANY LINEAR
COMBINATIONS(CONTRASTS) OF THE REGRESSION COEFFICIENTS.

IF YOU WANT TO STUDY THE HIGHEST DENSITY REGIONS(HDR) TYPE '1'
               OTHERWISE                             TYPE '0'
?1
```

HERE ARE THE MEAN OF THE REGRESSION COEFFICIENTS.

```
      INTERCEPT      =    0.81
         ENGLSH      =    0.04
          MATH       =    0.03
```

INCLUDE THE INTERCEPT YOU HAVE 3 COEFFICIENTS, YOU CAN AT MOST HAVE 3 SET OF THE CONTRASTS. THE FIRST SET OF THE CONTRAST WILL BE REFERED TO C1, AND THE SECOND SET WILL BE REFERED TO C2 ETC.

ENTER THE NUMBER OF THE CONTRASTS YOU WISH TO STUDY?2

ENTER THE COEFFICIENTS FOR C1?0,1,0
ENTER THE COEFFICIENTS FOR C2?0,0,1

HIGHEST DENSITY REGIONS

YOU WILL NOW BE ASKED TO ENTER HYPOTHETICAL VALUES FOR THE CONTRAST(S) YOU SELECTED FOR ANALYSIS. CADA WILL THEN DETERMINE THE PROBABILITY CONTENT OF THE SMALLEST JOINT HDR CONTAINING THESE VALUES.

PLEASE ENTER HYPOTHETICAL VALUES FOR THE FOLLOWING COEFFICIENT(S).

```
                        MEAN

   C1          =     0.04    HYP. VAL. =  ?0
   C2          =     0.03    HYP. VAL. =  ?0
```

SMALLEST HDR CONTAINING SET = 79.4%.

```
IF YOU WISH TO ENTER ANOTHER SET OF HYP. VAL      TYPE '1'
            TO STUDY ANOTHER SET OF CONTRASTS     TYPE '2'
            TO EXIT THE HDR                       TYPE '3'
?2
```

```
HERE ARE THE MEAN OF THE REGRESSION COEFFICIENTS.

      INTERCEPT      =    0.81
         ENGLSH      =    0.04
           MATH      =    0.03

INCLUDE THE INTERCEPT YOU HAVE  3  COEFFICIENTS, YOU CAN
AT MOST HAVE  3  SET OF THE CONTRASTS.  THE FIRST SET
OF THE CONTRAST WILL BE REFERED TO C1, AND THE SECOND SET
WILL BE REFERED TO C2 ETC.

ENTER THE NUMBER OF THE CONTRASTS YOU WISH TO STUDY?1

ENTER THE COEFFICIENTS FOR  C1?0,0,1




            HIGHEST DENSITY REGIONS

YOU WILL NOW BE ASKED TO ENTER HYPOTHETICAL VALUES FOR
THE CONTRAST(S) YOU SELECTED FOR ANALYSIS.  CADA WILL
THEN DETERMINE THE PROBABILITY CONTENT OF THE SMALLEST
JOINT HDR CONTAINING THESE VALUES.

PLEASE ENTER HYPOTHETICAL VALUES FOR THE FOLLOWING
COEFFICIENT(S).

                    MEAN

   C1          =    0.03   HYP. VAL. =  ?0


SMALLEST HDR CONTAINING SET = 48.5%.


IF YOU WISH TO ENTER ANOTHER SET OF HYP. VAL    TYPE '1'
            TO STUDY ANOTHER SET OF CONTRASTS   TYPE '2'
            TO EXIT THE HDR                     TYPE '3'
?3
```

YOU HAVE THE FOLLOWING AVAILABLE OPTIONS FOR EXAMINATION OF THE POSTERIOR DISTRIBUTIONS OF THE REGRSSION EQUATION.

1. THE DISTRIBUTION OF THE VARIANCE OF THE ERROR.
2. POSTERIOR ANALYSES OF THE REGRESSION COEFFICIENTS BETA.
3. THE OBSERVED AND PREDICTED VALUES FOR YOUR DATA.
4. PREDICTIVE DISTRIBUTION FOR CHOSEN PREDICTOR VALUES.
5. TO SAVE THE PARAMETERS OF REGRESSION EQUATION IN THE FILE FOR DECISION THEORY ANALYSIS
6. EXIT THE MODEL

TYPE THE NUMBER OF OPTIONS YOU WANT
?3

DATA SET =COLDAT TOTAL OBSERVATION = 25

OBSERVATION	OBSERVED	PREDICTED	RESIDUAL
1	2.40	2.218	0.182
2	0.40	1.777	-1.377
3	3.00	2.067	0.933
4	1.50	1.450	0.050
5	2.50	1.600	0.900
6	3.00	1.802	1.198
7	1.90	1.704	0.196
8	2.80	1.994	0.806
9	1.60	1.885	-0.285
10	1.10	2.010	-0.910
11	1.70	1.927	-0.227
12	3.30	2.146	1.154
13	1.10	2.343	-1.243
14	1.80	1.548	0.252
15	1.60	1.922	-0.322

IF YOU WANT TO CONTINUE DISPLAY TYPE '1'
STOP TYPE '0'

?1

```
DATA SET =COLDAT              TOTAL OBSERVATION =    25

OBSERVATION    OBSERVED        PREDICTED       RESIDUAL

 16               2.10           1.865           0.235
 17               1.10           1.147          -0.047
 18               1.60           1.766          -0.166
 19               2.70           2.302           0.398
 20               1.30           1.760          -0.460
 21               0.50           1.766          -1.266
 22               2.60           2.364           0.236
 23               1.70           1.912          -0.212
 24               1.40           2.083          -0.683
 25               2.60           1.942           0.658

WHEN YOU ARE READY TO CONTINUE                  TYPE '1'?1
```

```
YOU HAVE THE FOLLOWING AVAILABLE OPTIONS FOR EXAMINATION OF
THE POSTERIOR DISTRIBUTIONS OF  THE REGRSSION EQUATION.

  1. THE DISTRIBUTION OF THE VARIANCE OF THE ERROR.
  2. POSTERIOR ANALYSES OF THE REGRESSION COEFFICIENTS BETA.
  3. THE OBSERVED AND PREDICTED VALUES FOR YOUR DATA.
  4. PREDICTIVE DISTRIBUTION FOR CHOSEN PREDICTOR VALUES.
  5. TO SAVE THE PARAMETERS OF REGRESSION EQUATION IN THE
     FILE FOR DECISION THEORY ANALYSIS
  6. EXIT THE MODEL

TYPE THE NUMBER OF OPTIONS YOU WANT
?4
```

PREDICTIVE DISTRIBUTION ON THE NEXT OBSERVATION.

ENER THE PREDICTOR VALUES OF INTEREST.

```
ENGLSH              =?20
 MATH               =?20
```

1. HIGHEST DENSITY REGION
2. PROBABILITY LESS THAN SOME VALUE.
3. PROBABILITY BETWEEN TWO VALUES.
4. CHANGE THE PREDICTOR VALUES.

TYPE THE NUMBER OF THE OPTION YOU WANT (NONE=0).?1

```
HIGHEST DENSITY REGIONS

TO EXIT ROUTINE TYPE '0' WHEN ASKED FOR INPUT.
INPUT P% AS NUMBER FROM 1 THROUGH 99.

PREDICTOR      VALUE        COEFFICIENT
ENGLSH =       20.00          0.042
 MATH  =       20.00          0.026
----------------------    GPA    ------------------------------
MEAN                     2.16      DEGREES OF FREEDOM    22.00
STANDARD DEV.            0.79      SCALE PARAMETER       12.58
---------------------------------------------------------------
P%=?50
               50.0% HDR =      1.64 TO        2.68
P%=?60
               60.0% HDR =      1.51 TO        2.81
P%=?90
               90.0% HDR =      0.86 TO        3.46
P%=?95
               95.0% HDR =      0.59 TO        3.73
P%=?0




  1. HIGHEST DENSITY REGION
  2. PROBABILITY LESS THAN SOME VALUE.
  3. PROBABILITY BETWEEN TWO VALUES.
  4. CHANGE THE PREDICTOR VALUES.

TYPE THE NUMBER OF THE OPTION YOU WANT (NONE=0).?0
```

```
YOU HAVE THE FOLLOWING AVAILABLE OPTIONS FOR EXAMINATION OF
THE POSTERIOR DISTRIBUTIONS OF  THE REGRSSION EQUATION.

  1. THE DISTRIBUTION OF THE VARIANCE OF THE ERROR.
  2. POSTERIOR ANALYSES OF THE REGRESSION COEFFICIENTS BETA.
  3. THE OBSERVED AND PREDICTED VALUES FOR YOUR DATA.
  4. PREDICTIVE DISTRIBUTION FOR CHOSEN PREDICTOR VALUES.
  5. TO SAVE THE PARAMETERS OF REGRESSION EQUATION IN THE
     FILE FOR DECISION THEORY ANALYSIS
  6. EXIT THE MODEL

TYPE THE NUMBER OF OPTIONS YOU WANT
?6
```

```
   COMPONENT 25.  MULTIPLE LINEAR REGRESSION ANALYSIS

     1. NONINFORMATIVE PRIORS
     2. INFORMATIVE PRIORS

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' ).?2
```

BAYESIAN REGRESSION (INFORMATIVE PRIORS)

1. ASSESSMENT OF A PRIOR DISTRIBUTION
2. POSTERIOR ANALYSIS

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0').?1

SPECIFICATION OF A BAYES DISTRIBUTION FOR THE
PARAMETERS FOR THE STANDARD NORMAL
LINEAR REGRESSION MODEL

THIS MODULE WILL ASSIST YOU IN SPECIFYING YOUR BAYES DISTRIBUTION FOR THE PARAMETERS OF A SIMPLE OR MULTIPLE LINEAR REGRESSION MODEL.

WE ASSUME THAT YOUR DISTRIBUTION BELONGS TO THE FAMILY OF CONJUGATE DISTRIBUTIONS. THE PARAMETERS OF THIS FAMILY CAN BE DIVIDED INTO THREE GROUPS:

1. A VECTOR INDICATING THE CENTRAL TENDANCY OF YOUR DISTRIBUTION FOR THE REGRESSION COEFFICIENTS.

2. TWO NUMBERS, THE DEGREES OF FREEDOM AND THE SCALE FACTOR OF YOUR DISTRIBUTION OF THE VARIANCE OF THE ERROR (RESIDUAL VAR). JOINTLY THESE TWO PARAMETERS DETERMINE THE CENTER AND SPREAD OF THE DISTRIBUITON.

3. A MATRIX MEASURING THE DISPERSION OF YOUR DISTRIBUTION FOR THE REGRESSION COEFFICIENTS.

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

TO DETERMINE YOUR BAYES DISTRIBUTION FOR THESE PARAMETERS THE PRECEDURE WILL BEGIN BY ASKING YOU TO SPECIFY YOUR 50TH, 75TH AND 90TH PREDICTIVE PERCENTILE VALUES OF THE DEPENDENT VARIABLE CONDITIONAL ON SPECIFIC VALUES FOR THE INDEPENDENT VARIABLES.

THESE POINTS DIVIDE THE LINE INTO TWO SEGMENTS SO THAT YOU WOULD BE WILLING TO GIVE ,RESPECTIVELY, ONE TO ONE, THREE TO ONE, AND NINE TO ONE ODDS THAT, WITH THE INDEPENDENT VARIABLES FIXED AT SPECIFIED VALUES, THE DEPENDENT VARIABLE WOULD LIE BELOW THE INDICATED POINT.

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

TYPE THE NUMBER OF THE INDEPENDENT VARIABLES (MAX=4).
DO NOT CONSIDER THE INTERCEPT TO BE A SEPARATE VARIABLE.
?2

```
ENTER NAMES FOR EACH OF THE INDEPENDENT(PREDICTOR) VARIABLES,
MAXIMUM LENGTH OF EACH IS 6 CHARACTERS.

NAME FOR THE FIRST  INDEPENDENT VARIABLE?ENGLSH
NAME FOR THE SECOND INDEPENDENT VARIABLE?MATH


ENTER THE NAME FOR THE DEPENDENT VARIABLE, MAXIMUM LENGTH
IS 6 CHARACTERS.

NAME FOR THE DEPENDENT VARIABLE          ?GPA
```

```
NOW SPECIFY THE SMALLEST AND THE LARGEST VALUES OF THE
INDEPENDENT VARIABLES FOR WHICH YOU CAN COMFORTABLY
MAKE PREDICTIONS ABOUT  GPA.

ENTER THE SMALLEST VALUE OF  ENGLSH?0
ENTER THE  LARGEST VALUE OF  ENGLSH?36

ENTER THE SMALLEST VALUE OF  MATH  ?0
ENTER THE  LARGEST VALUE OF  MATH  ?36
```

```
WE WILL NOW ASK YOU TO ENTER 50TH, 75TH AND 90TH
PREDICTIVE PERCENTILE OF  GPA  FOR VARIOUS JOINT
VALUES OF ENGLSH AND MATH.

THINK OF THE 50TH PERCENTILE OF  GPA
  AS THE VALUE FOR WHICH YOU WOULD ACCEPT
  AN EVEN BET THAT  GPA  WOULD BE LESS
  THAN OR GREATER THAN THAT VALUE.

THINK OF THE 75TH PERCENTILE OF  GPA
  AS THE VALUE FOR WHICH YOU WOULD ACCEPT
  A 3 TO 1 BET THAT  GPA  WOULD BE LESS
  THAN THAT VALUE OR A 1 TO 3 BET THAT  GPA
  WOULD BE GREATER THAN THAT VALUE.

THINK OF THE 90TH PERCENTILE OF  GPA
  AS THE VALUE FOR WHICH YOU WOULD ACCEPT
  A 9 TO 1 BET THAT  GPA  WOULD BE LESS
  THAN THAT VALUE OR A 1 TO 9 BET THAT  GPA
  WOULD BE GREATER THAN THAT VALUE.

WHEN YOU ARE READY TO CONTINUE            TYPE '1'?1
```

```
IT IS NOW NECESSARY TO CONSIDER FOR WHAT VALUES OF THE INDE-
PENDENT VARIABLES YOU WILL BE ASKED TO PROVIDE PREDICTIVE
ASSESSMENTS.  CADA WILL INITIALLY GENERATE  A TOTAL OF  25
POINTS BY TAKING THE MAXIMUM AND MINIMUM VALUES FOR EACH
INDEPENDENT VARIABLE AND DIVIDE THE DISTANCE BETWEEN THESE
END POINTS INTO FOUR EQUAL INTERVALS.  THE PROGRAM WILL
OFFER EACH POINT SEQUENTIALLY.  AT EACH POINT YOU CAN

      1. ACCEPT AND ASSESS THE PREDICTIVE PERCENTILES
         FOR THIS POINT.
      2. REJECT(SKIP) AND CONTINUE TO THE SUBSEQUENT
         POINT.
      3. REVIEW OR CHANGE  ANY PREVIOUS ASSESSED
         PERCENTILES.

AFTER YOU HAVE PROVIDED SUFFICIENT INFORMATION TO FIT A
DISTRIBUTION FOR THE PARAMETERS, YOU MAY STOP THE
ASSESSMENT AT ANY POINT.  HOWEVER THE MORE POINTS YOU
PROVIDE THE MORE THOROUGHLY CADA CAN CHECK THE COHERENCE
OF YOUR BELIEFS AND THEREFORE GUIDE YOU TO A MORE ACCURATE
ASSESSMENT.

WHEN YOU ARE READY TO CONTINUE                  TYPE '1'?1
```

```
CONSIDER THE DISTRIBUTION OF  GPA  FOR THE FOLLOWING
VALUES OF  ENGLSH AND MATH.

VARIABLE   NAME       ENGLSH    MATH

                       9.00     27.00

IF YOU WANT TO ASSESS PERCENTILES FOR  GPA                TYPE '1'
            TO CONTINUE ASSESSMENT BUT SKIP THIS POINT TYPE '2'
?1


ENTER YOUR 50TH PERCENTILE OF   GPA?2
ENTER YOUR 75TH PERCENTILE OF   GPA?2.3
ENTER YOUR 90TH PERCENTILE OF   GPA?2.55
```

```
CONSIDER THE DISTRIBUTION OF  GPA  FOR THE FOLLOWING
VALUES OF  ENGLSH AND MATH.

VARIABLE   NAME       ENGLSH    MATH

                      27.00      9.00

IF YOU WANT TO ASSESS PERCENTILES FOR  GPA                TYPE '1'
            TO CONTINUE ASSESSMENT BUT SKIP THIS POINT TYPE '2'
            TO SEE THE PREVIOUS ASSESSED PERCENTILES   TYPE '3'
?1


ENTER YOUR 50TH PERCENTILE OF   GPA?1.9
ENTER YOUR 75TH PERCENTILE OF   GPA?2.1
ENTER YOUR 90TH PERCENTILE OF   GPA?2.3
```

```
CONSIDER THE DISTRIBUTION OF  GPA  FOR THE FOLLOWING
VALUES OF  ENGLSH AND MATH.

VARIABLE   NAME        ENGLSH    MATH

                       18.00     27.00

IF YOU WANT TO ASSESS PERCENTILES FOR  GPA                TYPE '1'
            TO CONTINUE ASSESSMENT BUT SKIP THIS POINT TYPE '2'
            TO SEE THE PREVIOUS ASSESSED PERCENTILES   TYPE '3'
?1

ENTER YOUR 50TH PERCENTILE OF   GPA?2.4
ENTER YOUR 75TH PERCENTILE OF   GPA?2.8
ENTER YOUR 90TH PERCENTILE OF   GPA?3.2
```

```
CONSIDER THE DISTRIBUTION OF  GPA  FOR THE FOLLOWING
VALUES OF  ENGLSH AND MATH.

VARIABLE   NAME        ENGLSH    MATH

                       27.00     18.00

IF YOU WANT TO ASSESS PERCENTILES FOR  GPA                TYPE '1'
            TO CONTINUE ASSESSMENT BUT SKIP THIS POINT TYPE '2'
            TO SEE THE PREVIOUS ASSESSED PERCENTILES   TYPE '3'
?1

ENTER YOUR 50TH PERCENTILE OF   GPA?2.2
ENTER YOUR 75TH PERCENTILE OF   GPA?2.6
ENTER YOUR 90TH PERCENTILE OF   GPA?3.1
```

```
CONSIDER THE DISTRIBUTION OF  GPA  FOR THE FOLLOWING
VALUES OF  ENGLSH AND MATH.

VARIABLE   NAME        ENGLSH    MATH

                       36.00     27.00

IF YOU WANT TO ASSESS PERCENTILES FOR  GPA                TYPE '1'
            TO CONTINUE ASSESSMENT BUT SKIP THIS POINT TYPE '2'
            TO SEE THE PREVIOUS ASSESSED PERCENTILES   TYPE '3'
            TO STOP THE ASSESSMENT PROCEDURE            TYPE '0'
?1

ENTER YOUR 50TH PERCENTILE OF   GPA?3.1
ENTER YOUR 75TH PERCENTILE OF   GPA?3.5
ENTER YOUR 90TH PERCENTILE OF   GPA?3.8
```

```
CONSIDER THE DISTRIBUTION OF  GPA  FOR THE FOLLOWING
VALUES OF  ENGLSH AND MATH.

VARIABLE   NAME        ENGLSH    MATH

                       27.00     36.00

IF YOU WANT TO ASSESS PERCENTILES FOR  GPA                TYPE '1'
            TO CONTINUE ASSESSMENT BUT SKIP THIS POINT TYPE '2'
            TO SEE THE PREVIOUS ASSESSED PERCENTILES   TYPE '3'
            TO STOP THE ASSESSMENT PROCEDURE            TYPE '0'
?2
```

```
CONSIDER THE DISTRIBUTION OF  GPA  FOR THE FOLLOWING
VALUES OF  ENGLSH AND MATH.

VARIABLE   NAME        ENGLSH    MATH

                        0.00     27.00

IF YOU WANT TO ASSESS PERCENTILES FOR  GPA                TYPE '1'
            TO CONTINUE ASSESSMENT BUT SKIP THIS POINT TYPE '2'
            TO SEE THE PREVIOUS ASSESSED PERCENTILES   TYPE '3'
            TO STOP THE ASSESSMENT PROCEDURE           TYPE '0'
?2
```

```
CONSIDER THE DISTRIBUTION OF  GPA  FOR THE FOLLOWING
VALUES OF  ENGLSH AND MATH.

VARIABLE   NAME        ENGLSH    MATH

                       27.00      0.00

IF YOU WANT TO ASSESS PERCENTILES FOR  GPA                TYPE '1'
            TO CONTINUE ASSESSMENT BUT SKIP THIS POINT TYPE '2'
            TO SEE THE PREVIOUS ASSESSED PERCENTILES   TYPE '3'
            TO STOP THE ASSESSMENT PROCEDURE           TYPE '0'
?2
```

```
CONSIDER THE DISTRIBUTION OF  GPA  FOR THE FOLLOWING
VALUES OF  ENGLSH AND MATH.

VARIABLE   NAME        ENGLSH    MATH

                        27.00     27.00

IF YOU WANT TO ASSESS PERCENTILES FOR  GPA              TYPE '1'
            TO CONTINUE ASSESSMENT BUT SKIP THIS POINT TYPE '2'
            TO SEE THE PREVIOUS ASSESSED PERCENTILES   TYPE '3'
            TO STOP THE ASSESSMENT PROCEDURE           TYPE '0'
?3
```

HERE ARE THE PREDICTIVE PERCENTILES YOU SPECIFIED:

	INDEPENDENT VARIABLES		PREDICTIVE PERCENTILE		
POINT	ENGLSH	MATH	50TH	75TH	90TH
1	9.00	27.00	2.00	2.30	2.55
2	27.00	9.00	1.90	2.10	2.30
3	18.00	27.00	2.40	2.80	3.20
4	27.00	18.00	2.20	2.60	3.10
5	36.00	27.00	3.10	3.50	3.80

```
IF YOU WANT TO PROCEED WITH THE FITTING                 TYPE '1'
            TO CHANGE ANY OF THE PERCENTILES            TYPE '2'
?1
```

```
CONSIDER THE DISTRIBUTION OF  GPA  FOR THE FOLLOWING
VALUES OF  ENGLSH AND MATH.

VARIABLE   NAME        ENGLSH    MATH

                       27.00     27.00

IF YOU WANT TO ASSESS PERCENTILES FOR  GPA                 TYPE '1'
            TO CONTINUE ASSESSMENT BUT SKIP THIS POINT TYPE '2'
            TO SEE THE PREVIOUS ASSESSED PERCENTILES   TYPE '3'
            TO STOP THE ASSESSMENT PROCEDURE           TYPE '0'
?1

ENTER YOUR 50TH PERCENTILE OF   GPA?2.9
ENTER YOUR 75TH PERCENTILE OF   GPA?3.3
ENTER YOUR 90TH PERCENTILE OF   GPA?3.7
```

```
CONSIDER THE DISTRIBUTION OF  GPA  FOR THE FOLLOWING
VALUES OF  ENGLSH AND MATH.

VARIABLE   NAME        ENGLSH    MATH

                       18.00      9.00

IF YOU WANT TO ASSESS PERCENTILES FOR  GPA                 TYPE '1'
            TO CONTINUE ASSESSMENT BUT SKIP THIS POINT TYPE '2'
            TO SEE THE PREVIOUS ASSESSED PERCENTILES   TYPE '3'
            TO STOP THE ASSESSMENT PROCEDURE           TYPE '0'
?0
```

```
HERE ARE THE PREDICTIVE PERCENTILES YOU SPECIFIED:

              INDEPENDENT VARIABLES              PREDICTIVE PERCENTILE

POINT         ENGLSH          MATH               50TH     75TH     90TH
  1            9.00          27.00               2.00     2.30     2.55
  2           27.00           9.00               1.90     2.10     2.30
  3           18.00          27.00               2.40     2.80     3.20
  4           27.00          18.00               2.20     2.60     3.10
  5           36.00          27.00               3.10     3.50     3.80
  6           27.00          27.00               2.90     3.30     3.70

IF YOU WANT TO PROCEED WITH THE FITTING                  TYPE '1'
            TO CHANGE ANY OF THE PERCENTILES             TYPE '2'
            TO ADD ADDITIONAL POINTS                     TYPE '3'
?1
```

```
    FITTED VALUES OF PARAMETERS OF THE REGRESSION
                   COEFFICIENTS

DEPENDENT VARIABLE GPA

  VARIABLE       FITTED VALUE

INTERCEPT           0.258
ENGLSH              0.042
MATH                0.052

TYPE THE NUMBER OF OPTION YOU WANT.
     1. ACCEPT THE FITTED VALUES.
     2. CHANGE THE SPECIFIED PERCENTILES.
     3. DISPLAY THE RESIDUALS FROM ASSESSED MEDIAN.
?3
```

```
        INDEPENDENT VARIABLES              PREDICTIVE PERCENTILE

POINT       ENGLSH           MATH          50TH     75TH     90TH RESIDUAL
 1           9.00           27.00          2.00     2.30     2.55  -0.02
 2          27.00            9.00          1.90     2.10     2.30   0.05*
 3          18.00           27.00          2.40     2.80     3.20   0.00
 4          27.00           18.00          2.20     2.60     3.10  -0.11*
 5          36.00           27.00          3.10     3.50     3.80  -0.05
 6          27.00           27.00          2.90     3.30     3.70   0.13*

THE NUMBERS WITH ASTERISK HAVE LARGE RESIDUALS (IN ABSOLUTE VALUE).

IF YOU WANT TO ACCEPT FIT                              TYPE '1'
            TO MODIFY ASSESSMENTS                      TYPE '2'
?1
```

```
THE ESTIMATED DEGREES OF FREEDOM FOR THE PREDICTIVE 'T'
DISTRIBUTION FOR  GPA  GIVEN  ENGLSH AND MATH.
IS   6.00.  THIS VALUE WAS OBTAINED BY AVERAGING THE
TAIL RATIOS FOR THE  6 SETS OF THE ASSESSMENTS YOU
PROVIDED.

THESE TAIL RATIO VALUES ARE OBTAINED AS THE RATIOS OF
THE DIFFERENCES BETWEEN THE 90TH AND 50TH TO THE
DIFFERENCE BETWEEN THE 75TH AND 50TH PERCENTILES OF
GPA  GIVEN  ENGLSH AND MATH.

IF YOUR JUDGMENTS WERE COHERENT AND THE MODEL FIT
PERFECTLY THESE RATIOS WOULD BE CONSTANT.

IF YOU WANT TO CONTINUE THE ASSESSMENT          TYPE '1'
            TO SEE THE TAIL RATIOS              TYPE '2'
?2
```

	INDEPENDENT VARIABLES		PREDICTIVE PERCENTILE			
POINT	ENGLSH	MATH	50TH	75TH	90TH	TAIL RATIO
1	9.00	27.00	2.00	2.30	2.55	1.90*
2	27.00	9.00	1.90	2.10	2.30	2.00
3	18.00	27.00	2.40	2.80	3.20	2.00
4	27.00	18.00	2.20	2.60	3.10	2.25
5	36.00	27.00	3.10	3.50	3.80	1.90*
6	27.00	27.00	2.90	3.30	3.70	2.00

THE NUMBERS WITH ASTERISK HAVE TAIL RATIOS SMALLER THAN THE LOWER BOUND, CADA HAS RESET TO THE MINIMUM VALUE (1.90)

THE AVERAGE OF TAIL RATIO IS 2.00867
THE ESTIMATED DEGREES OF FREEDOM IS 6

IF YOU WANT TO CONTINUE THE ASSESSMENT TYPE '1'
TO CHANGE THE PERCENTILES TYPE '2'
?1

YOU HAVE NOW GIVEN SUFFICIENT INFORMATION FOR CADA TO ESTIMATE A VECTOR INDICATING THE CENTRAL TENDANCY OF YOUR DISTRIBUTION OF THE REGRESSION COEFFICIENTS, AND DEGREES OF FREEDOM. YOUR ANSWERS TO THE NEXT SET OF QUESTIONS WILL ALLOW CADA TO ESTIMATE THE REMAINING PAREMETERS, A SCALE PARAMETER OF YOUR DISTRIBUTION OF THE VARIANCE OF THE ERROR, AND A MATRIX MEASURING THE DISPERSION OF YOUR DISTRIBUTION FOR THE REGRESSION COEFFICIENTS.

WE NOW WISH TO DETERMINE HOW OBSERVED DATA WOULD AFFECT YOUR CONDITIONAL JUDGMENTS ABOUT GPA. AFTER BEING GIVEN SOME HYPOTHETICAL DATA, YOU WILL BE ASKED TO PROVIDE NEW 50TH AND 75TH PERCENTILES OF GPA GIVEN ENGLSH AND MATH.

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

```
YOU ARE ASKED TO PROVIDE THE NUMBER OF POINTS USED IN YOUR
PREVIOUS ASSESSMENT FOR WHICH YOU WILL SPECIFY NEW 50TH
AND 75TH PERCENTILES OF GPA.  THIS MUST BE A NUMBER NOT
LESS THAN  4  AND NO MORE THAN  6.  A LARGER NUMBER OF
POINTS PROVIDES MORE THOROUGH COHERENCE TESTING.

IF YOU ARE ASKED ABOUT

           4 POINTS, YOU MUST ANSWER  14 QUESTIONS.
           5 POINTS, YOU MUST ANSWER  20 QUESTIONS.
           6 POINTS, YOU MUST ANSWER  27 QUESTIONS.

ENTER THE NUMBER OF POINTS YOU WILL USE ?5
```

```
SUPPOSE  GPA  HAVE THE FOLLOWING VALUES AT THE INDICATED POINTS.

POINT                  ASSESED        FITTED    NEW
 NO  ENGLSH MATH     50TH   75TH      50TH      OBS.

  1   9.00  27.00    2.00    2.30     2.02      2.23
--------------------------------------------------------------

CONDITIONAL ON THE NEW OBSERVATION(S) ENTER YOUR NEW 50TH
AND 75TH PERCENTILES FOR  GPA  AT THE INDICATED VALUES OF
ENGLSH AND MATH.

POINT                  ASSESSED        FITTED      NEW
 NO  ENGLSH MATH     50TH    75TH      50TH    50TH & 75TH

  2  27.00   9.00    1.90    2.10      1.85    ?2,2.2
```

FOR SOME FURTHER POINTS NOW ENTER YOUR NEW 50TH PERCENTILES OF GPA AT THE INDICATE VALUES OF THE ENGLSH AND MATH.

POINT NO	ENGLSH	MATH	ASSESSED 50TH	ASSESSED 75TH	FITTED 50TH	NEW 50TH
1	9.00	27.00	2.00	2.30	2.02	?2.2
3	18.00	27.00	2.40	2.80	2.40	?2.6
4	27.00	18.00	2.20	2.60	2.31	?2.4
5	36.00	27.00	3.10	3.50	3.15	?3.3

SUPPOSE GPA HAVE THE FOLLOWING VALUES AT THE INDICATED POINTS.

POINT NO	ENGLSH	MATH	ASSESED 50TH	ASSESED 75TH	FITTED 50TH	NEW OBS.
1	9.00	27.00	2.00	2.30	2.02	2.23

HERE ARE THE CONDITIONAL PERCENTILES YOU SPECIFIED:

POINT NO	ENGLSH	MATH	ASSESSED 50TH	ASSESSED 75TH	FITTED 50TH	CONDITIONAL 50TH	CONDITIONAL 75TH
1	9.00	27.00	2.00	2.30	2.02	2.20	
2	27.00	9.00	1.90	2.10	1.85	2.00	2.20
3	18.00	27.00	2.40	2.80	2.40	2.60	
4	27.00	18.00	2.20	2.60	2.31	2.40	
5	36.00	27.00	3.10	3.50	3.15	3.30	

```
IF YOU WANT TO CONTINUE THE ASSESSMENT             TYPE '1'
            TO CHANGE THE CONDITIONAL PERCENTILES  TYPE '0'
?1
```

SUPPOSE GPA HAVE THE FOLLOWING VALUES AT THE INDICATED POINTS.

POINT NO	ENGLSH	MATH	ASSESED 50TH	ASSESED 75TH	FITTED 50TH	NEW OBS.
1	9.00	27.00	2.00	2.30	2.02	2.23
2	27.00	9.00	1.90	2.10	1.85	2.14

CONDITIONAL ON THE NEW OBSERVATION(S) ENTER YOUR NEW 50TH AND 75TH PERCENTILES FOR GPA AT THE INDICATED VALUES OF ENGLSH AND MATH.

POINT NO	ENGLSH	MATH	ASSESSED 50TH	ASSESSED 75TH	FITTED 50TH	NEW 50TH & 75TH
3	18.00	27.00	2.40	2.80	2.40	?2.6,3

FOR SOME FURTHER POINTS NOW ENTER YOUR NEW 50TH PERCENTILES OF GPA AT THE INDICATE VALUES OF THE ENGLSH AND MATH.

POINT NO	ENGLSH	MATH	ASSESSED 50TH	ASSESSED 75TH	FITTED 50TH	NEW 50TH
2	27.00	9.00	1.90	2.10	1.85	?2.1
4	27.00	18.00	2.20	2.60	2.31	?2.4
5	36.00	27.00	3.10	3.50	3.15	?3.2

SUPPOSE GPA HAVE THE FOLLOWING VALUES AT THE INDICATED POINTS.

POINT NO	ENGLSH	MATH	ASSESED 50TH	ASSESED 75TH	FITTED 50TH	NEW OBS.
1	9.00	27.00	2.00	2.30	2.02	2.23
2	27.00	9.00	1.90	2.10	1.85	2.14

HERE ARE THE CONDITIONAL PERCENTILES YOU SPECIFIED:

POINT NO	ENGLSH	MATH	ASSESSED 50TH	ASSESSED 75TH	FITTED 50TH	CONDITIONAL 50TH	CONDITIONAL 75TH
2	27.00	9.00	1.90	2.10	1.85	2.10	
3	18.00	27.00	2.40	2.80	2.40	2.60	3.00
4	27.00	18.00	2.20	2.60	2.31	2.40	
5	36.00	27.00	3.10	3.50	3.15	3.20	

IF YOU WANT TO CONTINUE THE ASSESSMENT TYPE '1'
TO CHANGE THE CONDITIONAL PERCENTILES TYPE '0'

?1

SUPPOSE GPA HAVE THE FOLLOWING VALUES AT THE INDICATED POINTS.

POINT NO	ENGLSH	MATH	ASSESED 50TH	ASSESED 75TH	FITTED 50TH	NEW OBS.
1	9.00	27.00	2.00	2.30	2.02	2.23
2	27.00	9.00	1.90	2.10	1.85	2.14
3	18.00	27.00	2.40	2.80	2.40	2.88

CONDITIONAL ON THE NEW OBSERVATION(S) ENTER YOUR NEW 50TH AND 75TH PERCENTILES FOR GPA AT THE INDICATED VALUES OF ENGLSH AND MATH.

POINT NO	ENGLSH	MATH	ASSESSED 50TH	ASSESSED 75TH	FITTED 50TH	NEW 50TH & 75TH
4	27.00	18.00	2.20	2.60	2.31	?2.4,2.8

```
FOR SOME FURTHER POINTS NOW ENTER YOUR NEW 50TH PERCENTILES OF
GPA  AT THE INDICATE VALUES OF THE ENGLSH AND MATH.

POINT                    ASSESSED        FITTED      NEW
 NO  ENGLSH MATH      50TH     75TH       50TH       50TH

  3  18.00  27.00     2.40     2.80       2.40     ?2.7
  5  36.00  27.00     3.10     3.50       3.15     ?3.3
```

```
SUPPOSE  GPA  HAVE THE FOLLOWING VALUES AT THE INDICATED POINTS.

POINT                    ASSESED        FITTED     NEW
 NO  ENGLSH MATH      50TH    75TH      50TH      OBS.

  1   9.00  27.00     2.00    2.30      2.02      2.23
  2  27.00   9.00     1.90    2.10      1.85      2.14
  3  18.00  27.00     2.40    2.80      2.40      2.88
------------------------------------------------------------------

HERE ARE THE CONDITIONAL PERCENTILES YOU SPECIFIED:

POINT                    ASSESSED        FITTED     CONDITIONAL
 NO  ENGLSH MATH      50TH     75TH      50TH      50TH     75TH

  3  18.00  27.00     2.40     2.80      2.40      2.70
  4  27.00  18.00     2.20     2.60      2.31      2.40     2.80
  5  36.00  27.00     3.10     3.50      3.15      3.30

IF YOU WANT TO CONTINUE THE ASSESSMENT           TYPE '1'
           TO CHANGE THE CONDITIONAL PERCENTILES TYPE '0'
?1
```

SUPPOSE GPA HAVE THE FOLLOWING VALUES AT THE INDICATED POINTS.

POINT NO	ENGLSH	MATH	ASSESED 50TH	ASSESED 75TH	FITTED 50TH	NEW OBS.
1	9.00	27.00	2.00	2.30	2.02	2.23
2	27.00	9.00	1.90	2.10	1.85	2.14
3	18.00	27.00	2.40	2.80	2.40	2.88
4	27.00	18.00	2.20	2.60	2.31	2.68

CONDITIONAL ON THE NEW OBSERVATION(S) ENTER YOUR NEW 50TH AND 75TH PERCENTILES FOR GPA AT THE INDICATED VALUES OF ENGLSH AND MATH.

POINT NO	ENGLSH	MATH	ASSESSED 50TH	ASSESSED 75TH	FITTED 50TH	NEW 50TH & 75TH
5	36.00	27.00	3.10	3.50	3.15	?3.3,3.6

FOR SOME FURTHER POINTS NOW ENTER YOUR NEW 50TH PERCENTILES OF GPA AT THE INDICATE VALUES OF THE ENGLSH AND MATH.

POINT NO	ENGLSH	MATH	ASSESSED 50TH	ASSESSED 75TH	FITTED 50TH	NEW 50TH
4	27.00	18.00	2.20	2.60	2.31	?2.6

SUPPOSE GPA HAVE THE FOLLOWING VALUES AT THE INDICATED POINTS.

POINT NO	ENGLSH	MATH	ASSESED 50TH	75TH	FITTED 50TH	NEW OBS.
1	9.00	27.00	2.00	2.30	2.02	2.23
2	27.00	9.00	1.90	2.10	1.85	2.14
3	18.00	27.00	2.40	2.80	2.40	2.88
4	27.00	18.00	2.20	2.60	2.31	2.68

HERE ARE THE CONDITIONAL PERCENTILES YOU SPECIFIED:

POINT NO	ENGLSH	MATH	ASSESSED 50TH	75TH	FITTED 50TH	CONDITIONAL 50TH	75TH
4	27.00	18.00	2.20	2.60	2.31	2.60	
5	36.00	27.00	3.10	3.50	3.15	3.30	3.60

IF YOU WANT TO CONTINUE THE ASSESSMENT TYPE '1'
TO CHANGE THE CONDITIONAL PERCENTILES TYPE '0'

?1

SUPPOSE GPA HAVE THE FOLLOWING VALUES AT THE INDICATED POINTS.

POINT NO	ENGLSH	MATH	ASSESED 50TH	75TH	FITTED 50TH	NEW OBS.
1	9.00	27.00	2.00	2.30	2.02	2.23
2	27.00	9.00	1.90	2.10	1.85	2.14
3	18.00	27.00	2.40	2.80	2.40	2.88
4	27.00	18.00	2.20	2.60	2.31	2.68
5	36.00	27.00	3.10	3.50	3.15	3.51

CONDITIONAL ON THE NEW OBSERVATION(S) ENTER YOUR NEW
50TH PERCENTILE FOR GPA AT THE INDICATE VALUES OF
ENGLSH AND MATH.

POINT NO	ENGLSH	MATH	ASSESSED 50TH	75TH	FITTED 50TH	NEW 50TH
5	36.00	27.00	3.10	3.50	3.15	?3.4

SUPPOSE GPA HAVE THE FOLLOWING VALUES AT THE INDICATED POINTS.

POINT NO	ENGLSH	MATH	ASSESED 50TH	ASSESED 75TH	FITTED 50TH	NEW OBS.
1	9.00	27.00	2.00	2.30	2.02	2.23
2	27.00	9.00	1.90	2.10	1.85	2.14
3	18.00	27.00	2.40	2.80	2.40	2.88
4	27.00	18.00	2.20	2.60	2.31	2.68
5	36.00	27.00	3.10	3.50	3.15	3.51

HERE ARE THE CONDITIONAL PERCENTILES YOU SPECIFIED:

POINT NO	ENGLSH	MATH	ASSESSED 50TH	ASSESSED 75TH	FITTED 50TH	CONDITIONAL 50TH	CONDITIONAL 75TH
5	36.00	27.00	3.10	3.50	3.15	3.40	

IF YOU WANT TO CONTINUE THE ASSESSMENT TYPE '1'
TO CHANGE THE CONDITIONAL PERCENTILES TYPE '0'
?1

THERE IS A PAUSE FOR CALCULATION.

```
THE DISTRIBUTION OF THE VARIANCE OF THE ERROR IS AN
INVERSE CHI-SQUARE VARIABLE ON   6  DEGREES OF
FREEDOM WITH THE SCALE PARAMETER    0.16 AND

25TH PERCENTILE       =        0.02
50TH PERCENTILE       =        0.03
75TH PERCENTILE       =        0.05
50 PERCENT HDR          0.05    TO      0.07
75 PERCENT HDR          0.04    TO      0.09
95 PERCENT HDR          0.04    TO      0.13

WHEN YOU ARE READY TO CONTINUE                     TYPE '1'?1
```

```
THE DISTRIBUTION OF THE REGRESSION COEFFICIENTS BETA IS A
3-VARIATE T VARIABLE WITH   6  DEGREES OF FREEDOM AND
THE FOLLOWING PARAMETERS:

                 CENTER

INTERCEPT     =  0.258
   ENGLSH     =  0.042
   MATH       =  0.052

               SPREAD   MATRIX

     1.1721      -0.0202       -0.0313
    -0.0202       0.0004        0.0005
    -0.0313       0.0005        0.0011

IF YOU WANT THE EXPLANATIONS OF THE CENTER THE SPREAD TYPE '1'
                              ELSE                    TYPE '0'
?1
```

THE STANDARD MULTIVARIATE T VARIABLE WITH G DEGREES OF FREEDOM Y IS DISTRIBUTED AS THE PRODUCT OF A STANDARD MULTIVARIATE NORMAL VARIABLE AND THE SQUARE ROOT OF G DIVIDED BY AN INDEPENDENT CHI-SQUARE VARIABLE WITH G DEGREES OF FREEDOM.

THEN THE GENERAL MULTIVARIATE T VARIABLE WIHT G DEGREES OF FREEDOM HAS THE GENERIC VECTOR Z=A+B*Y, WHERE A AND B ARE CONSTANT VECTOR AND MATRIX RESPECTIVELY. WE SAY THAT

C(Z)=A IS THE CENTER OF Z.

S(Z)=B*B' IS THE SPREAD OF Z.

WHEN THE DEGREES OF FREEDOM G IS GREATER THAN 1, SO THAT THE MEAN EXISTS, THE CENTER EQUALS THE MEAN. WHEN G IS GREATER THAN 2, SO THAT THE VARIANCE EXISTS, THE SPREAD TIMES THE CONSTANT G/(G-2) IS THE VARIANCE.

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

HERE IS A SUMMARY OF THE PARAMETERS OF YOUR DISTRIBUTION (YOU MAY WISH TO RECORD THESE NUMBERS FOR LATER USE.)

1. A VECTOR FOR THE CENTRAL TENDANCY.

INTERCEPT	ENGLSH	MATH
0.258	0.042	0.052

2. TWO NUMBERS, THE DEGREES OF FREEDOM AND THE SCALE PARAMETER.

D.F = 6.00 SCALE PARAMETER = 0.16

3. A MATRIX FOR THE DISPERSION OF THE REGRESSION COEFFICIENTS.

1.1721	-0.0202	-0.0313
-0.0202	0.0004	0.0005
-0.0313	0.0005	0.0011

THIS COMPLETES THE ASSESSMENT OF THE PRIOR DISTRIBUTION.

IF YOU WANT TO DO A POSTERIOR ANALYSIS TYPE '1'
TO EXIT THE MODULE TYPE '2'
?1

```
HERE IS THE DATA SET YOU WILL DO THE POSTERIOR ANALYSIS.

DATA SET =COLDAT

GROUPS     1        COLL6               OBSERVATIONS = 25
           2        COLL7                            25
           3        COLL8                            25
           4        COLL9                            25
           5        COLL10                           25
           6        COLL11                           25
           7        COLL12                           25
           8        COLL13                           25
           9        COLL15                           25
           10       COLL19                           25

 TYPE THE NUMBER OF THE GROUP YOU WANT (NONE=0).?2
```

```
VARIABLES  1        ENGLSH
           2         MATH
           3        NATSCI
           4         GPA

TYPE THE VARIABLE NUMBER FOR THE DEPENDENT VARIABLE (NONE=0)?4

TYPE THE VARIABLE NUMBERS FOR THE  2     INDEPENDENT VARIABLES
IT MUST BE THE SAME ORDER AS IT APPEARS IN PRIORS.
?1,2
```

```
HERE ARE THE SUMMARY OF THE POSTERIOR DISTRIBUTION OF THE
REGRESSION EQUATION, YOU MAY WISH TO RECORD THESE NUMBERS.

THE POSTERIOR DISTRIBUTION OF THE VARIANCE OF THE ERROR
IS AN INVERSE CHI-SQUARE VARIABLE ON  31.00  DEGREES OF
FREEDOM WITH THE SCALE PARAMETER    16.27.

THE POSTERIOR DISTRIBUTION OF THE REGRESSION COEFFICIENTS
BETA IS A  3-VARIATE T VARIABLE WITH

                 MEAN
INTERCEPT    =   0.97
  ENGLSH     =   0.03
   MATH      =   0.03

            POSTERIOR COVARIANCE MATRIX

       0.814        -0.018        -0.021
      -0.018         0.001        -0.000
      -0.021        -0.000         0.001

WHEN YOU ARE READY TO CONTINUE                   TYPE '1'?1




YOU HAVE THE FOLLOWING AVAILABLE OPTIONS FOR EXAMINATION OF
THE POSTERIOR DISTRIBUTIONS OF  THE REGRSSION EQUATION.

  1. THE DISTRIBUTION OF THE VARIANCE OF THE ERROR.
  2. POSTERIOR ANALYSES OF THE REGRESSION COEFFICIENTS BETA.
  3. THE OBSERVED AND PREDICTED VALUES FOR YOUR DATA.
  4. PREDICTIVE DISTRIBUTION FOR CHOSEN PREDICTOR VALUES.
  5. TO SAVE THE PARAMETERS OF REGRESSION EQUATION IN THE
     FILE FOR DECISION THEORY ANALYSIS
  6. EXIT THE MODEL

TYPE THE NUMBER OF OPTIONS YOU WANT
?2
```

```
THE JOINT POSTERIOR DISTRIBUTION OF THE COEFFICIENTS BETA IS
A 3-VARIATE T DISTRIBUTION WITH  31 DEGREES OF FREEDOM
AND THE FOLLOWING PARAMETERS:

          INTERCEPT    ENGLSH     MATH

  MEAN       0.97      0.03      0.03

          VARIANC/COVARIANCE MATRIX

       0.814       -0.018        -0.021
      -0.018        0.001        -0.000
      -0.021       -0.000         0.001

YOU MAY ALSO OBTAINED INFORMATION ABOUT THE DISTRIBUTION
OF THE COEFFICIENTS BY STUDYING THE JOINT HIGHEST DENSITY
REGIONS (HDR) OF THE MARGIANL DISTRIBUTION OF ANY LINEAR
COMBINATIONS(CONTRASTS) OF THE REGRESSION COEFFICIENTS.

IF YOU WANT TO STUDY THE HIGHEST DENSITY REGIONS(HDR) TYPE '1'
               OTHERWISE                                 TYPE '0'
?1

HERE ARE THE MEAN OF THE REGRESSION COEFFICIENTS.

     INTERCEPT      =    0.97
        ENGLSH      =    0.03
         MATH       =    0.03

INCLUDE THE INTERCEPT YOU HAVE  3  COEFFICIENTS, YOU CAN
AT MOST HAVE  3  SET OF THE CONTRASTS.  THE FIRST SET
OF THE CONTRAST WILL BE REFERED TO C1, AND THE SECOND SET
WILL BE REFERED TO C2 ETC.

ENTER THE NUMBER OF THE CONTRASTS YOU WISH TO STUDY?3

ENTER THE COEFFICIENTS FOR  C1?1,0,0
ENTER THE COEFFICIENTS FOR  C2?0,1,0
ENTER THE COEFFICIENTS FOR  C3?0,0,1
```

HIGHEST DENSITY REGIONS

```
YOU WILL NOW BE ASKED TO ENTER HYPOTHETICAL VALUES FOR
THE CONTRAST(S) YOU SELECTED FOR ANALYSIS.  CADA WILL
THEN DETERMINE THE PROBABILITY CONTENT OF THE SMALLEST
JOINT HDR CONTAINING THESE VALUES.

PLEASE ENTER HYPOTHETICAL VALUES FOR THE FOLLOWING
COEFFICIENT(S).

                    MEAN

   C1         =     0.97   HYP. VAL. =   ?0
   C2         =     0.03   HYP. VAL. =   ?0
   C3         =     0.03   HYP. VAL. =   ?0

SET IS NOT IN THE 99% HDR.

IF YOU WISH TO ENTER ANOTHER SET OF HYP. VAL     TYPE '1'
            TO STUDY ANOTHER SET OF CONTRASTS    TYPE '2'
            TO EXIT THE HDR                      TYPE '3'
?3
```

```
YOU HAVE THE FOLLOWING AVAILABLE OPTIONS FOR EXAMINATION OF
THE POSTERIOR DISTRIBUTIONS OF  THE REGRSSION EQUATION.

  1. THE DISTRIBUTION OF THE VARIANCE OF THE ERROR.
  2. POSTERIOR ANALYSES OF THE REGRESSION COEFFICIENTS BETA.
  3. THE OBSERVED AND PREDICTED VALUES FOR YOUR DATA.
  4. PREDICTIVE DISTRIBUTION FOR CHOSEN PREDICTOR VALUES.
  5. TO SAVE THE PARAMETERS OF REGRESSION EQUATION IN THE
     FILE FOR DECISION THEORY ANALYSIS
  6. EXIT THE MODEL

TYPE THE NUMBER OF OPTIONS YOU WANT
?6
```

```
COMPONENT 25.  MULTIPLE LINEAR REGRESSION ANALYSIS

      1. NONINFORMATIVE PRIORS
      2. INFORMATIVE PRIORS

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' ).?0
```

```
COMPONENT GROUP 2.  SIMPLE BAYESIAN PARAMETRIC MODELS

21.  BINARY MODELS
22.  UNIVARIATE NORMAL MODELS
23.  MULTI-CATEGORY MODELS
24.  SIMPLE LINEAR REGRESSION ANALYSIS
25.  MULTIPLE LINEAR REGRESSION ANALYSIS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?0
```

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?

Component Group 3

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?3

COMPONENT GROUP 3. DECISION THEORETIC MODELS

31. UTILITIES AND EXPECTED UTILITIES
32. EDUCATIONAL AND EMPLOYMENT SELECTION
33. SELECTION OF EDUCATIONAL TREATMENT

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?31

COMPONENT 31. UTILITIES AND EXPECTED UTILITIES

1. ASSESSMENT OF UTILITIES
2. EVALUATION OF UTILITIES

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?1

MODEL 1. ASSESSMENT OF UTILITIES

1. FIXED STATE LEAST SQUARES ASSESSMENT
2. REGIONAL COHERENCE ASSESSMENT
3. LOCAL COHERENCE ASSESSMENT

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1

```
NINE-POINT UNIVARIATE LEAST-SQUARES UTILITY ASSESSMENT

            FOR AN EXPLANATION, TYPE '2'.
            TO CONTINUE,        TYPE '1'.
            TO EXIT,            TYPE '0'.?2
```

```
THIS MODULE WILL ASSIST YOU IN FITTING A UTILITY FUNCTION ON
A ONE-DIMENSIONAL ATTRIBUTE.  YOU ARE TO SPECIFY WHICH NINE
POINTS ALONG THIS ONE-DIMENSIONAL CONTINUUM YOU WANT TO USE
IN THE FITTING PROCEDURE.

IT IS ASSUMED THAT YOU WANT TO ASSIGN A UTILITY OF  0  TO THE
FIRST POINT YOU SPECIFY AND A UTILITY OF  1  TO THE LAST POINT.
THE OTHER SEVEN POINTS WILL BE ASSIGNED UTILITIES BETWEEN  0
AND  1.

CHOOSE YOUR POINTS SO THAT THE MAJOR REGIONS IN WHICH YOUR
UTILITIES INCREASE ARE IDENTIFIED BY AT LEAST ONE POINT.
NO TWO POINTS SHOULD HAVE APPROXIMATELY THE SAME UTILITY.

THE POINTS YOU SPECIFY MUST BE EXPRESSIBLE IN XXX.XX FORMAT.
THERE MUST BE NOT MORE THAN THREE DIGITS TO THE LEFT OF THE
DECIMAL POINT NOR MORE THAN TWO TO THE RIGHT OF IT.

NOW YOU WILL BE ASKED TO SPECIFY YOUR POINTS.

TO CONTINUE                                           TYPE '1'?1
```

```
SPECIFY THE  NINE POINTS  YOU  WANT TO USE IN ASSESSING YOUR
UTILITY  FUNCTION  BEGINNING  WITH  THE ONE  TO BE  ASSIGNED
UTILITY 0.  THE UTILITIES  OF  SUBSEQUENT  POINTS  SHOULD BE
MONOTONICALLY INCREASING  WITH THE LAST POINT BEING ASSIGNED
UTILITY 1.

SPECIFY POINT 1?0
SPECIFY POINT 2?.5
SPECIFY POINT 3?1
SPECIFY POINT 4?1.5
SPECIFY POINT 5?2
SPECIFY POINT 6?2.5
SPECIFY POINT 7?3
SPECIFY POINT 8?3.5
SPECIFY POINT 9?4
```

```
HERE ARE THE POINTS YOU SPECIFIED.

POINT  1  :   0.00
POINT  2  :   0.50
POINT  3  :   1.00
POINT  4  :   1.50
POINT  5  :   2.00
POINT  6  :   2.50
POINT  7  :   3.00
POINT  8  :   3.50
POINT  9  :   4.00

IF THE POINTS WERE ENTERED CORRECTLY TYPE '1', ELSE '0'.?1
```

```
SUPPOSE THAT YOU HAD A CHOICE BETWEEN:

     A SURE THING OF            1.50; AND

     A GAMBLE GIVING YOU        2.00  WITH PROBABILITY P,  OR
                                1.00  WITH PROBABILITY 1 MINUS P.

IF P=1, YOU WOULD PREFER THE GAMBLE; IF P=0, YOU WOULD PREFER
THE SURE THING.  FOR SOME SET OF P-VALUES LESS THAN 1, YOU WOULD
PREFER THE GAMBLE; FOR SOME SET OF P-VALUES GREATER THAN 0, YOU
WOULD PREFER THE SURE THING.

THERE IS A UNIQUE P-VALUE THAT SEPARATES THESE TWO SETS AND FOR
WHICH YOU WOULD BE INDIFFERENT BETWEEN THE SURE THING AND THE
GAMBLE

YOU WILL BE ASKED TO DETERMINE THE VALUE OF THIS INDIFFERENCE P.
FOR THIS PROCESS, THE GAMBLES MAY BE PRESENTED IN ONE OF TWO
FORMATS.

TO CONTINUE                                              TYPE '1'?1
```

```
IN FORMAT 1, YOU WILL BE ASKED TO STATE YOUR INDIFFERENCE OR
PREFERENCE FOR EACH OF A SUCCESSION OF CHOICES BETWEEN A GAMBLE
AND A SURE THING.  FOR EXAMPLE, WHEN THE REQUEST:

   ----------------------------------------------       OPTION:
  I                                              I
  I                     P       2.00             I     0.  INDIFFERENT
  I FOR SURE     1.50                 GAMBLE     I     1.  FOR SURE
  I                    1-P      1.00             I     2.  GAMBLE
  I                                              I     3.  RESTART
   ----------------------------------------------

           WHICH WOULD YOU PREFER IF P = .20            ?

APPEARS, YOU ARE ASKED TO DECIDE WHETHER YOU WOULD RATHER HAVE:

     A SURE THING GIVING YOU     1.50;
OR
     A CHANCE AT GETTING         2.00  WITH PROBABILITY P,   OR
                                 1.00  WITH PROBABILITY 1-P.

TO CONTINUE                                              TYPE '1'?1
```

```
------------------------------------------------------------   OPTION:
I                                                          I
I                        P       2.00                      I   0.  INDIFFERENT
I  FOR SURE     1.50                       GAMBLE          I   1.  FOR SURE
I                       1-P      1.00                      I   2.  GAMBLE
I                                                          I   3.  RESTART
------------------------------------------------------------
```

WHICH WOULD YOU PREFER IF P = .20 ?

ASSUMING THAT YOU PREFER:

2.00 TO 1.50,
1.50 TO 1.00,

IT FOLLOWS THAT YOUR DECISION WILL DEPEND UPON THE VALUE OF P.

IF P IS NEAR ZERO, FOR EXAMPLE, YOU ARE LIKELY TO PREFER THE FOR SURE OPTION. ON THE OTHER HAND, IF P IS NEAR ONE, YOU ARE LIKELY TO PREFER THE GAMBLE.

TO CONTINUE TYPE '1'?1

```
------------------------------------------------------------   OPTION:
I                                                          I
I                        P       2.00                      I   0.  INDIFFERENT
I  FOR SURE     1.50                       GAMBLE          I   1.  FOR SURE
I                       1-P      1.00                      I   2.  GAMBLE
I                                                          I   3.  RESTART
------------------------------------------------------------
```

WHICH WOULD YOU PREFER IF P = .20 ?

THE BASIC IDEA OF THIS PART OF THE ASSESSMENT PROCEDURE IS TO DETERMINE THE VALUE, P, FOR WHICH YOU ARE INDIFFERENT, OR HAVE NO PREFERENCE, BETWEEN THE TWO OPTIONS.

NOTE THAT THIS P IS EQUAL TO THE UTILITY OF THE FOR-SURE POINT GIVEN THAT THE P POINT IS ASISIGNED A UTILITY OF 1 AND THE 1-P POINT IS ASSIGNED A UTILITY OF 0. A P OF .5 IMPLIES LINEARITY; A P OF GREATER THAN .5, CONCAVITY; AND A P OF LESS THAN .5, CONVEXITY. USE A P OF .5 IF THE THREE POINTS ARE OF APPROXIMATELY THE SAME UTILITY.

TO CONTINUE TYPE '1'?1

IN FORMAT 2, YOU WILL BE ASKED TO GIVE YOUR INDIFFERENCE P FOR EACH OF A SUCCESSION OF CHOICES BETWEEN A GAMBLE AND A SURE THING. FOR EXAMPLE, WHEN THE REQUEST

FOR SURE	GAMBLES P	1-P	P THAT MAKES YOU INDIFFERENT
1.50	2.00	1.00	?

APPEARS, YOU ARE TO RESPOND BY TYPING THE VALUE OF P THAT WOULD MAKE YOU INDIFFERENT BETWEEN:

A SURE THING OF 1.50; AND

A GAMBLE GIVING YOU 2.00 WITH PROBABILITY P, OR
1.00 WITH PROBABILITY 1-P.

TO CONTINUE TYPE '1'?1

FOR SURE	GAMBLES P	1-P	P THAT MAKES YOU INDIFFERENT
1.50	2.00	1.00	?

IT MIGHT BE HELPFUL TO REMEMBER THAT IF WE ASSIGN:

UTILITY 0 TO 1.00, AND
UTILITY 1 TO 2.00,

THEN THE P YOU ARE ASKED TO GIVE IS THE CONDITIONAL UTILITY OF

THE SURE THING: 1.50.

WHEN THE GAMBLE AND FOR SURE OPTIONS INVOLVE ADJACENT OUTCOMES, AND THE EXPECTED VALUE OF THE GAMBLE FOR THE SPECIFIED P IS GREATER THAN THE VALUE OF THE FOR SURE OUTCOME, THEN THE UTILITY FUNCTION IS LOCALLY CONVEX; IF THE EXPECTED VALUE IS LESS, IT IS LOCALLY CONCAVE; AND IF THE EXPECTED VALUE IS THE SAME, IT IS LOCALLY LINEAR.

TO CONTINUE TYPE '1'?1

YOUR OPTIONS OF FORMAT ARE:

1. SPECIFY A PREFERENCE FOR A CHOICE BETWEEN A GAMBLE AND A SURE THING, GIVEN A PROBABILITY FOR THE GAMBLE;
2. SPECIFY A PROBABILITY WHICH WOULD MAKE YOU INDIFFERENT BETWEEN A GAMBLE AND A SURE THING.

ENTER THE NUMBER OF THE OPTION YOU WANT (ELSE '0').?2

PLEASE EXPRESS YOUR INDIFFERENCE PROBABILITY FOR THESE GAMBLES.

FOR SURE	GAMBLES P	1-P	P THAT MAKES YOU INDIFFERENT
0.50	1.00	0.00	?.5
1.00	1.50	0.50	?.5
1.50	2.00	1.00	?.5
2.00	2.50	1.50	?.35
2.50	3.00	2.00	?.65
3.00	3.50	2.50	?.55
3.50	4.00	3.00	?.45

PLEASE INDICATE FOR WHICH SET OF GAMBLES YOU WOULD FEEL MOST COMFORTABLE EXPRESSING YOUR INDIFFERENCE.

	FOR SURE	P	GAMBLE	1-P
SET 1:	0.50	4.00		0.00
	1.00	4.00		0.00
	1.50	4.00		0.00
	2.00	4.00		0.00
	2.50	4.00		0.00
	3.00	4.00		0.00
	3.50	4.00		0.00

	FOR SURE	P	GAMBLE	1-P
SET 2:	1.00	2.00		0.00
	1.50	2.50		0.50
	2.00	3.00		1.00
	2.50	3.50		1.50
	3.00	4.00		2.00
	1.50	3.00		0.00
	2.00	4.00		0.00

WHICH SET OF GAMBLES DO YOU CHOOSE?2

PLEASE EXPRESS YOUR INDIFFERENCE PROBABILITY FOR THESE GAMBLES.

FOR SURE	GAMBLES P	1-P	P THAT MAKES YOU INDIFFERENT
1.00	2.00	0.00	?.5
1.50	2.50	0.50	?.4
2.00	3.00	1.00	?.45
2.50	3.50	1.50	?.65
3.00	4.00	2.00	?.55
1.50	3.00	0.00	?.4
2.00	4.00	0.00	?.45

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TYPE OF GAMBLE	GAMBLE NO.	FOR SURE	GAMBLES P	1-P	INDIFF. P SPECIFIED
INITIAL	1	0.50	1.00	0.00	.50
	2	1.00	1.50	0.50	.50
	3	1.50	2.00	1.00	.50
	4	2.00	2.50	1.50	.35
	5	2.50	3.00	2.00	.65
	6	3.00	3.50	2.50	.55
	7	3.50	4.00	3.00	.45
OTHER	8	1.00	2.00	0.00	.50
	9	1.50	2.50	0.50	.40
	10	2.00	3.00	1.00	.45
	11	2.50	3.50	1.50	.65
	12	3.00	4.00	2.00	.55
	13	1.50	3.00	0.00	.40
	14	2.00	4.00	0.00	.45

1. ACCEPT THE GAMBLES
2. CHANGE A GAMBLE
3. DELETE A GAMBLE
4. LIST THE GAMBLES

OPTION?1

HERE ARE THE UTILITY ESTIMATES BASED ON THE ADJACENT GAMBLES ONLY.
THESE WILL BE REFERRED TO AS THE 'INITIAL' UTILITIES.

0.00	0.00
0.50	0.12
1.00	0.23
1.50	0.35
2.00	0.46
2.50	0.68
3.00	0.79
3.50	0.88
4.00	1.00

TO KEEP THESE POINTS AND CONTINUE WITH THE ANALYSIS, TYPE '1'.
TO CHANGE SOME OF THE GAMBLES, TYPE '2'.
TO SPECIFY ANOTHER SET OF POINTS, TYPE '3'.?1

A NON-LINEAR LEAST-SQUARES FIT OF THE SPECIFIED PROBABILITIES WILL NOW BE ATTEMPTED USING AN ITERATIVE PROCESS THAT WILL TERMINATE WHEN THE FIT STABILIZES. THE FUNCTION VALUE IS THE SUM OF SQUARED DEVIATIONS OF THE FIT FROM THE SPECIFIED P IN LOG-ODDS METRIC.

ITERATION 1   FUNCTION VALUE IS 9.90949E-02
ITERATION 2   FUNCTION VALUE IS 9.88783E-02

CONVERGENCE IS COMPLETE TO A TOLERANCE OF .005.
TO CONTINUE   TYPE '1'?1

UTILITIES INITIAL	UTILITIES FIT	GAMBLE NO.	FOR SURE	GAMBLES P	GAMBLES 1-P	INDIFF. P SPEC'D	INDIFF. P FIT	DIFF. LOGODDS
0.00	0.00	1	0.50	1.00	0.00	0.50	0.50	-0.01
0.12	0.11	2	1.00	1.50	0.50	0.50	0.49	-0.03
0.23	0.22	3	1.50	2.00	1.00	0.50	0.49	-0.06
0.35	0.33	4	2.00	2.50	1.50	0.35	0.36	0.05
0.46	0.45	5	2.50	3.00	2.00	0.65	0.66	0.05
0.68	0.66	6	3.00	3.50	2.50	0.55	0.53	-0.09
0.79	0.77	7	3.50	4.00	3.00	0.45	0.43	-0.09
0.88	0.87	8	1.00	2.00	0.00	0.50	0.48	-0.06
1.00	1.00	9	1.50	2.50	0.50	0.40	0.40	0.01
		10	2.00	3.00	1.00	0.45	0.42	-0.11
		11	2.50	3.50	1.50	0.65	0.62	-0.14
		12	3.00	4.00	2.00	0.55	0.59	0.15
		13	1.50	3.00	0.00	0.40	0.43	0.12
		14	2.00	4.00	0.00	0.45	0.45	0.01

OPTIONS:
1. ACCEPT THE FITTED LEAST-SQUARES (LSQ) UTILITIES.
2. MODIFY THE P VALUES USING THE FIT AS A WORKING SET.
3. MODIFY THE P VALUES USING THE SPECIFIED AS A WORKING SET.
4. SEE A GRAPH OF THE LEAST-SQUARES UTLITIES.

OPTION?1

```
HERE ARE SEVERAL OPTIONS YOU MAY FIND HELPFUL IN
EVALUATING THE ASSESSED UTILITY FUNCTION.

 1. DISPLAY THE ASSESSED UTILITIES AND THOSE IMPLIED
    BY ANY FITTED PARAMETRIC FUNCTION
 2. DISPLAY THE INDIFFERENCE PROBABILITIES FOR CHOICE
    SITUATIONS THAT ARE IMPLIED BY THE ASSESSED UTILITIES
    AND ANY FITTED PARAMETRIC FUNCTIONS
 3. DISPLAY A GRAPH OF THE ASSESSED UTILITIES OR OF ANY
    UTILITIES DETERMINED BY A FITTED PARAMETRIC FUNCTION
 4. FIT NORMAL AND STUDENT'S T CDF TO ASSESSED UTILITIES
 5. FIT A GENERALIZED BETA CDF TO ASSESSED UTILITIES
 6. COMPUTE EXPECTED UTILITIES

TYPE THE NUMBER OF THE OPTION YOU WANT (EXIT=0)?4
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```
      FITTING A NORMAL OGIVE UTILITY FUNCTION

THIS MODULE ATTEMPTS TO FIT A NORMAL OGIVE FUNCTION TO YOUR
LEAST SQUARES UTILITIES.

HERE ARE SEVERAL REASONS  FOR CONSIDERING NORMAL OGIVE FITS.

    1. EXPECTED UTILITY CALCULATIONS ARE VERY SIMPLE WHEN THE
       THE UTILITY FUNCTION IS A NORMAL OGIVE AND THE EXPECT-
       ATION IS WITH RESPECT TO A NORMAL DISTRIBUTION.
    2. BY FITTING A SEGMENT OF THE NORMAL OGIVE FUNCTION IT IS
       POSSIBLE TO FIT UTILITIES THAT REFLECT RISK PRONENESS,
       RISK NEUTRALITY OR RISK AVERSION.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1
```

HERE IS A BRIEF DESCRIPTION OF THE FITTING PROCEDURE.

THE FITTING PROCEDURE IS ACTUALLY CONCERNED WITH FITTING THE INDIFFERENCE PROBABILITIES IMPLIED BY YOUR ASSESSED UTILITIES.

THE LOG ODDS OF THE INDIFFERENCE PROBABILITIES IMPLIED BY THE FITTED NORMAL OGIVE AND THE UTILITIES ARE DIFFERENCED AND THE SUM OF SQUARES OF THESE DIFFERENCES MINIMIZED TO DETERMINE THE FIT.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

HERE ARE YOUR ASSESSED AND FITTED NORMAL OGIVE UTILITIES. THE NORMAL OGIVE UTILITIES HAVE BEEN LINEARLY TRANSFORMED SO THE SMALLEST OUTCOME IS ASSIGNED UTILITY 0 AND THE LARGEST IS ASSIGNED UTILITY 1.

	-------------	UTILITIES	-------------
OUTCOME	ASSESS'D	NORMAL	ASS'D-NORMAL
0.000	0.00	0.00	
0.500	0.11	0.11	-.00
1.000	0.22	0.23	-.01
1.500	0.33	0.35	-.02
2.000	0.45	0.48	-.02
2.500	0.66	0.60	0.06
3.000	0.77	0.73	0.04
3.500	0.87	0.87	0.00
4.000	1.00	1.00	

THE INTERVAL FROM 0.00 TO 4.00 OF THE FOLLOWING NORMAL OGIVE FUNCTION WAS FITTED:

NORMAL OGIVE: MEAN= 3.884 ST.DEV.= 6.208

DO YOU WANT TO SEE THE INDIFFERENCE PROBABILITIES IMPLIED BY THE NORMAL OGIVE FIT (NO=0 YES=1) ?1

HERE ARE THE INDIFFERENCE PROBABILITIES FOR THE ADJACENT GAMBLES.

	------ GAMBLE -----		-- INDIFFERENCE PROB. --		
FOR SURE	P	1-P	ASS'D	NORMAL	ASS'D-NOR
0.50	1.00	0.00	0.50	0.49	0.01
1.00	1.50	0.50	0.49	0.49	0.00
1.50	2.00	1.00	0.49	0.49	-.01
2.00	2.50	1.50	0.36	0.49	-.13
2.50	3.00	2.00	0.66	0.50	0.16
3.00	3.50	2.50	0.53	0.50	0.03
3.50	4.00	3.00	0.43	0.50	-.07

DO YOU WANT A GRAPH OF THE FITTED UTILITIES (NO=0 YES=1) ?1

```
 OUTCOME                   UTILITY
---------I----1----2----3----4----5----6----7----8----9----0
    0.00 I
    0.22 I\\
    0.44 I\\\\
    0.67 I\\\\1\\
    0.89 I\\\\1\\\\2
    1.11 I\\\\1\\\\2\\
    1.33 I\\\\1\\\\2\\\\3
    1.56 I\\\\1\\\\2\\\\3\\\
    1.78 I\\\\1\\\\2\\\\3\\\\4
    2.00 I\\\\1\\\\2\\\\3\\\\4\\\
    2.22 I\\\\1\\\\2\\\\3\\\\4\\\\5\
    2.44 I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\
    2.67 I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\
    2.89 I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\\\7
    3.11 I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\\\7\\\
    3.33 I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\\\7\\\\8\
    3.56 I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\\\7\\\\8\\\\
    3.78 I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\\\7\\\\8\\\\9\\
    4.00 I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\\\7\\\\8\\\\9\\\\0
---------I----1----2----3----4----5----6----7----8----9---10
                                       CONTINUE=1?1
```

A STUDENT'S T CUMUALTIVE DISTRIBUTION FUNCTION FIT WILL NOW BE ATTEMPTED.

THE STUDENT'S T FIT IS BASED ON THE NORMAL OGIVE FIT.

EACH STUDENT'S T TRIED HAS THE SAME MEAN AND STANDARD DEVIATION AS THE NORMAL THAT HAS ALREADY BEEN FITTED.

THE FIT SELECTED IS THE ONE THAT MINIMIZES THE SUM OF THE SQUARE DIFFERENCES BETWEEN YOUR ASSESSED UTILITIES AND THE ADJUSTED STUDENT'S T UTILITIES.

THE ADJUSTED STUDENT'S T UTILITIES ARE FOUND BY LINEARLY TRANSFORMING THE STUDENT'S T UTILITIES SO THAT THE SMALLEST OUTCOME IS ASSIGNED UTILITY 0 AND THE LARGEST IS ASSIGNED UTILITY 1.

THERE WILL BE A PAUSE FOR CALCULATIONS.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

IT APPEARS THAT THE HIGHER THE DEGREES OF FREEDOM THE BETTER THE FIT. THEREFORE THE STUDENT'S T AND THE NORMAL FITS ARE FOR ALL PRACTICAL PURPOSES EQUALLY GOOD.

IF YOU WANT TO USE A STUDENT'S T CUMULATIVE DISTRIBUTION FUNCTION AS YOUR UTILITY FUNCTION, WE SUGGEST YOU USE THE ONE WITH THE FOLLOWING PARAMETERS.

DEGRESS OF FREEDOM	23
MEAN	3.884
SCALE PARAMETER	809.325

THIS COMPLETES THE FITTING PROCESS, TYPE '1' TO CONTINUE?1

HERE ARE SEVERAL OPTIONS YOU MAY FIND HELPFUL IN
EVALUATING THE ASSESSED UTILITY FUNCTION.

1. DISPLAY THE ASSESSED UTILITIES AND THOSE IMPLIED BY ANY FITTED PARAMETRIC FUNCTION
2. DISPLAY THE INDIFFERENCE PROBABILITIES FOR CHOICE SITUATIONS THAT ARE IMPLIED BY THE ASSESSED UTILITIES AND ANY FITTED PARAMETRIC FUNCTIONS
3. DISPLAY A GRAPH OF THE ASSESSED UTILITIES OR OF ANY UTILITIES DETERMINED BY A FITTED PARAMETRIC FUNCTION
4. FIT NORMAL AND STUDENT'S T CDF TO ASSESSED UTILITIES
5. FIT A GENERALIZED BETA CDF TO ASSESSED UTILITIES
6. COMPUTE EXPECTED UTILITIES

TYPE THE NUMBER OF THE OPTION YOU WANT (EXIT=0)?1

UTILITIES

UTILITIES HAVE BEEN MULTIPLIED BY 100 TO ENHANCE THE
READABILITY OF THE DISPLAY.

OUTCOME	ASSESSED	NORMAL	T
0.00	0	0	0
0.50	11	11	11
1.00	22	23	23
1.50	33	35	35
2.00	45	48	47
2.50	66	60	60
3.00	77	73	73
3.50	87	87	87
4.00	100	100	100

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

HERE ARE SEVERAL OPTIONS YOU MAY FIND HELPFUL IN EVALUATING THE ASSESSED UTILITY FUNCTION.

1. DISPLAY THE ASSESSED UTILITIES AND THOSE IMPLIED BY ANY FITTED PARAMETRIC FUNCTION
2. DISPLAY THE INDIFFERENCE PROBABILITIES FOR CHOICE SITUATIONS THAT ARE IMPLIED BY THE ASSESSED UTILITIES AND ANY FITTED PARAMETRIC FUNCTIONS
3. DISPLAY A GRAPH OF THE ASSESSED UTILITIES OR OF ANY UTILITIES DETERMINED BY A FITTED PARAMETRIC FUNCTION
4. FIT NORMAL AND STUDENT'S T CDF TO ASSESSED UTILITIES
5. FIT A GENERALIZED BETA CDF TO ASSESSED UTILITIES
6. COMPUTE EXPECTED UTILITIES

TYPE THE NUMBER OF THE OPTION YOU WANT (EXIT=0)?2

HERE ARE THE INDIFFERENCE PROBABILITIES FOR SELECTED CHOICE SITUATIONS.

THE PROBABILITIES HAVE BEEN MULTIPLIED BY 100 TO ENHANCE THE READABILITY OF THE DISPLAY.

CHOICE SITUATION			INDIFFERENCE PROBABILITIES		
1-P	FOR SURE	P	ASSESSED	NORMAL	T
0.00	0.50	1.00	50	49	49
0.50	1.00	1.50	49	49	49
1.00	1.50	2.00	49	49	49
1.50	2.00	2.50	36	49	49
2.00	2.50	3.00	66	50	49
2.50	3.00	3.50	53	50	50
3.00	3.50	4.00	43	50	50

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

```
HERE ARE SEVERAL OPTIONS YOU MAY FIND HELPFUL IN
EVALUATING THE ASSESSED UTILITY FUNCTION.

 1. DISPLAY THE ASSESSED UTILITIES AND THOSE IMPLIED
    BY ANY FITTED PARAMETRIC FUNCTION
 2. DISPLAY THE INDIFFERENCE PROBABILITIES FOR CHOICE
    SITUATIONS THAT ARE IMPLIED BY THE ASSESSED UTILITIES
    AND ANY FITTED PARAMETRIC FUNCTIONS
 3. DISPLAY A GRAPH OF THE ASSESSED UTILITIES OR OF ANY
    UTILITIES DETERMINED BY A FITTED PARAMETRIC FUNCTION
 4. FIT NORMAL AND STUDENT'S T CDF TO ASSESSED UTILITIES
 5. FIT A GENERALIZED BETA CDF TO ASSESSED UTILITIES
 6. COMPUTE EXPECTED UTILITIES

TYPE THE NUMBER OF THE OPTION YOU WANT (EXIT=0)?3






    1. LEAST SQUARES
    2. NORMAL
    3. STUDENT'S T

WHICH UTILITY FUNCTION DO YOU WANT GRAPHED (NONE=0) ?1
```

```
OUTCOME I----1----2----3----4----5----6----7----8----9---10
  0.00  I
  0.22  I\\
  0.44  I\\\\
  0.67  I\\\\1\\
  0.89  I\\\\1\\\\
  1.11  I\\\\1\\\\2\\
  1.33  I\\\\1\\\\2\\\\
  1.56  I\\\\1\\\\2\\\\3\\
  1.78  I\\\\1\\\\2\\\\3\\\\
  2.00  I\\\\1\\\\2\\\\3\\\\4\\
  2.22  I\\\\1\\\\2\\\\3\\\\4\\\\5\\
  2.44  I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\
  2.67  I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\\\7
  2.89  I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\\\7\\
  3.11  I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\\\7\\\\
  3.33  I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\\\7\\\\8\
  3.56  I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\\\7\\\\8\\\\
  3.78  I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\\\7\\\\8\\\\9\\
  4.00  I\\\\1\\\\2\\\\3\\\\4\\\\5\\\\6\\\\7\\\\8\\\\9\\\\0
        I----1----2----3----4----5----6----7----8----9---10
ASSESSED                                             CONTINUE=1?1
```

```
    1. LEAST SQUARES
    2. NORMAL
    3. STUDENT'S T

WHICH UTILITY FUNCTION DO YOU WANT GRAPHED (NONE=0) ?0
```

```
HERE ARE SEVERAL OPTIONS YOU MAY FIND HELPFUL IN
EVALUATING THE ASSESSED UTILITY FUNCTION.

 1. DISPLAY THE ASSESSED UTILITIES AND THOSE IMPLIED
    BY ANY FITTED PARAMETRIC FUNCTION
 2. DISPLAY THE INDIFFERENCE PROBABILITIES FOR CHOICE
    SITUATIONS THAT ARE IMPLIED BY THE ASSESSED UTILITIES
    AND ANY FITTED PARAMETRIC FUNCTIONS
 3. DISPLAY A GRAPH OF THE ASSESSED UTILITIES OR OF ANY
    UTILITIES DETERMINED BY A FITTED PARAMETRIC FUNCTION
 4. FIT NORMAL AND STUDENT'S T CDF TO ASSESSED UTILITIES
 5. FIT A GENERALIZED BETA CDF TO ASSESSED UTILITIES
 6. COMPUTE EXPECTED UTILITIES

TYPE THE NUMBER OF THE OPTION YOU WANT (EXIT=0)?6
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```
HERE ARE THE TYPES OF DISTRIBUTION WITH RESPECT TO WHICH
YOU CAN TAKE THE EXPECTATION.

     1. NORMAL
     2. STUDENT'S T
     3. GENERALIZED BETA

TYPE THE NUMBER OF THE TYPE OF DISTRIBUTION WITH RESPECT
TO WHICH YOU WANT TO TAKE THE EXPECTATION (EXIT=0)?1
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```
WHAT IS THE MEAN OF THE EXPECTING DISTRIBUTION ?2.1

WHAT IS THE STANDARD DEVIATION ?.9
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EXPECTATION WITH RESPECT TO A NORMAL DISTRIBUTION
                   MEAN =          2.100
     STANDARD DEVIATION =          0.900


             ASSESSED   = 0.519

          NORMAL   OGIVE  = 0.510
           MEAN=   3.88
           S.D.=   6.21

          STUDENT'S    T  = 0.508
           MEAN=   3.88
           D.F.=     23

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1
```

```
HERE ARE THE TYPES OF DISTRIBUTION WITH RESPECT TO WHICH
YOU CAN TAKE THE EXPECTATION.

     1. NORMAL
     2. STUDENT'S T
     3. GENERALIZED BETA

TYPE THE NUMBER OF THE TYPE OF DISTRIBUTION WITH RESPECT
TO WHICH YOU WANT TO TAKE THE EXPECTATION (EXIT=0)?0
```

```
HERE ARE SEVERAL OPTIONS YOU MAY FIND HELPFUL IN
EVALUATING THE ASSESSED UTILITY FUNCTION.

 1. DISPLAY THE ASSESSED UTILITIES AND THOSE IMPLIED
    BY ANY FITTED PARAMETRIC FUNCTION
 2. DISPLAY THE INDIFFERENCE PROBABILITIES FOR CHOICE
    SITUATIONS THAT ARE IMPLIED BY THE ASSESSED UTILITIES
    AND ANY FITTED PARAMETRIC FUNCTIONS
 3. DISPLAY A GRAPH OF THE ASSESSED UTILITIES OR OF ANY
    UTILITIES DETERMINED BY A FITTED PARAMETRIC FUNCTION
 4. FIT NORMAL AND STUDENT'S T CDF TO ASSESSED UTILITIES
 5. FIT A GENERALIZED BETA CDF TO ASSESSED UTILITIES
 6. COMPUTE EXPECTED UTILITIES

TYPE THE NUMBER OF THE OPTION YOU WANT (EXIT=0)?0
```

MODEL 1. ASSESSMENT OF UTILITIES

1. FIXED STATE LEAST SQUARES ASSESSMENT
2. REGIONAL COHERENCE ASSESSMENT
3. LOCAL COHERENCE ASSESSMENT

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?2

REGIONAL COHERENCE ASSESSMENT PROCEDURE

IF YOU WANT AN EXPLANATION, TYPE '2', ELSE '1'.?2

EXPLANATION OF REGIONAL COHERENCE ASSESSMENT

THE REGIONAL COHERENCE ASSESSMENT PROCEDURE PRESENTS YOU WITH HYPOTHETICAL CHOICE SITUATION CONSISTING OF A FOR SURE AND A CHANCE OPTION.

A FOR SURE OPTION IS ONE THAT OFFERS YOU THE CERTAINTY OF OF KNOWING THE OUTCOME IF YOU CHOOSE IT.

A CHANCE OPTION (ALSO REFERRED TO AS A GAMBLE) IS ONE THAT OFFERS YOU A PROBABILISTIC CHANCE AT TWO POSSIBLE OUTCOMES.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

HERE IS AN EXAMPLE OF HOW A CHOICE SITUATION CONSTRUCTED OF A FOR SURE AND CHANCE OPTION IS PRESENTED.

```
50     P CHANCE
45       FOR SURE
40   1-P CHANCE
```

YOU ARE ASKED TO DECIDE IF YOU WOULD RATHER HAVE 45 FOR SURE OR TAKE A CHANCE AT GETTING EITHER 40 OR 50.

ASSUMING THAT YOU PREFER 50 TO 45, AND 45 TO 40, IT FOLLOWS THAT YOUR DECISION WILL DEPEND ON THE VALUE OF P.

IF P IS NEAR ZERO, FOR EXAMPLE, THEN YOU ARE LIKELY TO PREFER THE FOR SURE OPTION. ON THE OTHER HAND IF P IS NEAR ONE YOU ARE LIKELY TO PREFER THE CHANCE OPTION.

THE BASIC IDEA OF THIS PART OF THE ASSESSMENT PROCEDURE IS TO DETERMINE THE VALUE P FOR WHICH YOU ARE INDIFFERENT, OR HAVE NO PREFERENCE BETWEEN THE TWO OPTIONS.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

THIS PROCEDURE IS CALLED THE REGIONAL COHERENCE ASSESSMENT PROCEDURE BECAUSE IT REQUIRES THAT YOUR PREFERENCES AMONG A SET OF CHOICE SITUATIONS INVOLVING FOUR OUTCOMES TAKEN ONE AT A TIME BE CONSISTENT IN AN EXPECTED UTILITY SENSE.

OVERALL COHERENCE IS ACHIEVED BY HAVING SOME OVERLAP BETWEEN THE OUTCOMES IN THE DIFFERENT REGIONS.

ONE ADVANTAGE OF THIS APPROACH IS THE EASE WITH WHICH ONE CAN CHECK FOR AND CORRECT ANY INCCHERENCIES.

THIS COMPLETES THE EXPLANATION OF THIS PROCEDURE.

IF YOU WANT TO USE THIS PROCEDURE, TYPE '1', ELSE '0'.?1

WE NOW WANT YOU TO SPECIFY SEVERAL OF THE OUTCOMES TO WHICH YOU WANT TO ASSIGN UITLITIES.

YOU CAN SPECIFY EITHER FIVE, SEVEN OR NINE OUTCOMES. YOU YOU SHOULD SPECIFY THE SMALLEST AND LARGEST OUTCOMES AND THREE, FIVE OR SEVEN OUTCOMES IN BETWEEN.

HOW MANY OUTCOMES DO YOU WANT TO SPECIFY (5,7,OR 9) ?7

```
PLEASE SPECIFY 7 OUTCOMES BEGINNING WITH THE SMALLEST.

FOR DISPLAY PURPOSES WE MUST ASK YOU TO SCALE YOUR OUTCOMES
SO THAT THEY ALL FALL IN THE RANGE -999.99 TO 999.99.

WHAT IS YOUR SMALLEST OUTCOME ?0

WHAT IS YOUR LARGEST OUTCOME ?4
```

```
NOW SPECIFY THE OTHER 5 OUTCOMES BEGINNING WITH THE
NEXT TO SMALLEST OUTCOME OR OUTCOME 2.

SMALLEST =        0.00    LARGEST =        4.00

OUTCOME  2     = ?1
OUTCOME  3     = ?1.5
OUTCOME  4     = ?2
OUTCOME  5     = ?2.5
OUTCOME  6     = ?3
```

```
HERE IS WHAT YOU ENTERED.

   OUTCOME 1 =       0.00
   OUTCOME 2 =       1.00
   OUTCOME 3 =       1.50
   OUTCOME 4 =       2.00
   OUTCOME 5 =       2.50
   OUTCOME 6 =       3.00
   OUTCOME 7 =       4.00

DID YOU ENTER THE OUTCOMES CORRECTLY (NO=0 YES=1)?1
```

```
PLEASE INDICATE FOR THE P VALUES PRESENTED IF YOU PREFER
THE FOR SURE OR THE CHANCE OPTION BELOW.

        -----------------------------
      I                             I
      I        2.00   P    CHANCE   I   INDIFFERENT=0
      I        1.50        FOR SURE I   FOR SURE   =1
      I        1.00  1-P   CHANCE   I   CHANCE     =2
      I                             I   RESTART    =3
        -----------------------------
IF YOU ARE INDIFFERENT BETWEEN THE OPTIONS, TYPE '0'.
IF YOU PREFER THE FOR SURE OPTION,          TYPE '1'.
IF YOU PREFER THE CHANCE OPTION,            TYPE '2'.
IF YOU WANT TO RESTART THE QUESTIONING,     TYPE '3'.

WHICH WOULD YOU PREFER IF P WERE   .5            ?0
```

```
PLEASE INDICATE FOR THE P VALUES PRESENTED IF YOU PREFER
THE FOR SURE OR THE CHANCE OPTION BELOW.

      -------------------------------
      I                             I
      I        2.50   P    CHANCE   I   INDIFFERENT=0
      I        2.00        FOR SURE I   FOR SURE   =1
      I        1.50  1-P   CHANCE   I   CHANCE     =2
      I                             I   RESTART    =3
      -------------------------------

IF YOU ARE INDIFFERENT BETWEEN THE OPTIONS, TYPE '0'.
IF YOU PREFER THE FOR SURE OPTION,           TYPE '1'.
IF YOU PREFER THE CHANCE OPTION,             TYPE '2'.
IF YOU WANT TO RESTART THE QUESTIONING,      TYPE '3'.

WHICH WOULD YOU PREFER IF P WERE   .4          ?2
WHICH WOULD YOU PREFER IF P WERE   .3          ?1
WHICH WOULD YOU PREFER IF P WERE   .35         ?0
```

```
THE P VALUES YOU SAID WOULD MAKE YOU INDIFFERENT BETWEEN
THE OPTIONS IN SITUATIONS 1 AND 2 BELOW IMPLY THAT
YOU WOULD BE INDIFFERENT BETWEEN THE OPTIONS IN THE OTHER
TWO SITUATIONS FOR THE P VALUES DISPLAYED.

                                 SITUATIONS
                ----- 1 --------- 2 --------- 3 --------- 4 -
  P CHANCE          2.00        2.50        2.50        2.50
  FOR SURE          1.50        2.00        1.50        2.00
1-P CHANCE          1.00        1.50        1.00        1.00

                 P = .50     P = .35     P = .26     P = .52

ARE YOU INDIFFERENT FOR THESE P VALUES (NO=0 YES=1)?1
```

```
PLEASE INDICATE FOR THE P VALUES PRESENTED IF YOU PREFER
THE FOR SURE OR THE CHANCE OPTION BELOW.

     -------------------------------
    I                              I
    I       3.00    P   CHANCE     I    INDIFFERENT=0
    I       2.50        FOR SURE   I    FOR SURE   =1
    I       2.00  1-P   CHANCE     I    CHANCE     =2
    I                              I    RESTART    =3
     -------------------------------
IF YOU ARE INDIFFERENT BETWEEN THE OPTIONS, TYPE '0'.
IF YOU PREFER THE FOR SURE OPTION,          TYPE '1'.
IF YOU PREFER THE CHANCE OPTION,            TYPE '2'.
IF YOU WANT TO RESTART THE QUESTIONING,     TYPE '3'.

WHICH WOULD YOU PREFER IF P WERE   .5            ?1
WHICH WOULD YOU PREFER IF P WERE   .85           ?2
WHICH WOULD YOU PREFER IF P WERE   .75           ?2
WHICH WOULD YOU PREFER IF P WERE   .65           ?0
```

```
PLEASE INDICATE FOR THE P VALUES PRESENTED IF YOU PREFER
THE FOR SURE OR THE CHANCE OPTION BELOW.

     -------------------------------
    I                              I
    I       4.00    P   CHANCE     I    INDIFFERENT=0
    I       3.00        FOR SURE   I    FOR SURE   =1
    I       2.50  1-P   CHANCE     I    CHANCE     =2
    I                              I    RESTART    =3
     -------------------------------
WHICH WOULD YOU PREFER IF P WERE   .4            ?1
WHICH WOULD YOU PREFER IF P WERE   .8            ?2
WHICH WOULD YOU PREFER IF P WERE   .7            ?2
WHICH WOULD YOU PREFER IF P WERE   .6            ?2
WHICH WOULD YOU PREFER IF P WERE   .5            ?2
WHICH WOULD YOU PREFER IF P WERE   .45           ?0
```

THE P VALUES YOU SAID WOULD MAKE YOU INDIFFERENT BETWEEN THE OPTIONS IN SITUATIONS 1 AND 2 BELOW IMPLY THAT YOU WOULD BE INDIFFERENT BETWEEN THE OPTIONS IN THE OTHER TWO SITUATIONS FOR THE P VALUES DISPLAYED.

SITUATIONS

	1	2	3	4
P CHANCE	3.00	4.00	4.00	4.00
FOR SURE	2.50	3.00	2.50	3.00
1-P CHANCE	2.00	2.50	2.00	2.00
	P = .65	P = .45	P = .46	P = .70

ARE YOU INDIFFERENT FOR THESE P VALUES (NO=0 YES=1)?0

FOR WHICH SITUATION WOULD YOU MOST LIKE TO CHANGE P ?1

WHAT WOULD YOU LIKE THIS P VALUE TO BE ?.65

WHICH OTHER SITUATION WOULD YOU LIKE TO SPECIFY P FOR ?4

WHAT IS THE P VALUE YOU WANT TO SPECIFY?.6

THE P VALUES YOU SAID WOULD MAKE YOU INDIFFERENT BETWEEN THE OPTIONS IN SITUATIONS 1 AND 4 BELOW IMPLY THAT YOU WOULD BE INDIFFERENT BETWEEN THE OPTIONS IN THE OTHER TWO SITUATIONS FOR THE P VALUES DISPLAYED.

SITUATIONS

	1	2	3	4
P CHANCE	3.00	4.00	4.00	4.00
FOR SURE	2.50	3.00	2.50	3.00
1-P CHANCE	2.00	2.50	2.00	2.00
	P = .65	P = .34	P = .39	P = .60

ARE YOU INDIFFERENT FOR THESE P VALUES (NO=0 YES=1)?1

HERE ARE FOUR ADDITIONAL SITUATIONS AND SETS OF P VALUES FOR THESE SITUATIONS THAT ARE COHERENT WITH YOUR STATED PREFERENCES.

	1	2	3	4
P CHANCE	1.50	2.00	2.00	2.50
FOR SURE	1.00	1.00	1.50	1.50
1-P CHANCE	0.00	0.00	0.00	0.00

EXAMPLES OF COHERENT PROBABILITY SETS

P = .25	P = .14	P = .57	P = .32
P = .50	P = .33	P = .67	P = .41
P = .75	P = .60	P = .80	P = .58

THESE SETS OF P VALUES ARE PRESENTED TO GIVE YOU AN IDEA OF SETS OF P VALUES THAT ARE COHERENT WITH WHAT YOU HAVE PREVIOUSLY SAID ABOUT YOUR PREFERENCES.

CONSIDER SITUATION 1 AND DECIDE WHAT P VALUE WOULD MAKE YOU INDIFFERENT IN THIS SITUATION. THE P VALUE DOES NOT HAVE TO BE ONE OF THOSE DISPLAYED.

WHAT P DO YOU WANT FOR SITUATION 1 ?.65

HERE IS THE COHERENT PROBABILITY SET IMPLIED BY YOUR CHOICE OF THE INDIFFERENCE PROBABILITY FOR SITUATION 1.

	1	2	3	4
P CHANCE	1.50	2.00	2.00	2.50
FOR SURE	1.00	1.00	1.50	1.50
1-P CHANCE	0.00	0.00	0.00	0.00
	P = .65	P = .48	P = .74	P = .50

ARE YOU SATISFIED WITH THIS SET (NO=0 YES=1) ?1

HERE ARE THE UTILITIES CONSISTENT WITH YOUR PREFERENCES.

SCORE	UTILITY
0.00	0.00
1.00	0.22
1.50	0.33
2.00	0.45
2.50	0.66
3.00	0.78
4.00	1.00

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

HERE ARE SEVERAL OPTIONS YOU MAY FIND HELPFUL IN EVALUATING THE ASSESSED UTILITY FUNCTION.

1. DISPLAY THE ASSESSED UTILITIES AND THOSE IMPLIED BY ANY FITTED PARAMETRIC FUNCTION
2. DISPLAY THE INDIFFERENCE PROBABILITIES FOR CHOICE SITUATIONS THAT ARE IMPLIED BY THE ASSESSED UTILITIES AND ANY FITTED PARAMETRIC FUNCTIONS
3. DISPLAY A GRAPH OF THE ASSESSED UTILITIES OR OF ANY UTILITIES DETERMINED BY A FITTED PARAMETRIC FUNCTION
4. FIT NORMAL AND STUDENT'S T CDF TO ASSESSED UTILITIES
5. FIT A GENERALIZED BETA CDF TO ASSESSED UTILITIES
6. COMPUTE EXPECTED UTILITIES

TYPE THE NUMBER OF THE OPTION YOU WANT (EXIT=0)?0

MODEL 1. ASSESSMENT OF UTILITIES

1. FIXED STATE LEAST SQUARES ASSESSMENT
2. REGIONAL COHERENCE ASSESSMENT
3. LOCAL COHERENCE ASSESSMENT

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?3

LOCAL COHERENCE ASSESSMENT PROCEDURE

IF YOU WANT AN EXPLANATION, TYPE '2', ELSE '1'.?2

EXPLANATION OF LOCAL COHERENCE ASSESSMENT

THE LOCAL COHERENCE ASSESSMENT PROCEDURE PRESENTS YOU WITH TWO TYPES OF HYPOTHETICAL CHOICE SITUATIONS.

ONE TYPE OF SITUATION IS CONSTRUCTED OF A FOR SURE OPTION AND A CHANCE OPTION.

THE OTHER TYPE OF SITUATION IS CONSTRUCTED OF TWO CHANCE OPTIONS.

A FOR SURE OPTION IS ONE THAT OFFERS YOU THE CERTAINTY OF KNOWING THE OUTCOME IF YOU CHOOSE IT.

A CHANCE OPTION (ALSO REFERRED TO AS A GAMBLE) IS ONE THAT OFFERS YOU A PROBABILISTIC CHANCE AT TWO POSSIBLE OUTCOMES.

IN EACH TYPE OF SITUATION YOU ARE ASKED TO EXPRESS YOUR PREFERENCE BETWEEN THE OPTIONS.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

HERE IS AN EXAMPLE OF HOW A CHOICE SITUATION CONSTRUCTED OF A FOR SURE AND CHANCE OPTION IS PRESENTED.

```
50    P CHANCE
45      FOR SURE
40  1-P CHANCE
```

YOU ARE ASKED TO DECIDE IF YOU WOULD RATHER HAVE 45 FOR SURE OR TAKE A CHANCE AT GETTING EITHER 40 OR 50.

ASSUMING THAT YOU PREFER 50 TO 45, AND 45 TO 40, IT FOLLOWS THAT YOUR DECISION WILL DEPEND ON THE VALUE OF P.

IF P IS NEAR ZERO, FOR EXAMPLE, THEN YOU ARE LIKELY TO PREFER THE FOR SURE OPTION. ON THE OTHER HAND IF P IS NEAR ONE YOU ARE LIKELY TO PREFER THE CHANCE OPTION.

THE BASIC IDEA OF THIS PART OF THE ASSESSMENT PROCEDURE IS TO DETERMINE THE VALUE P FOR WHICH YOU ARE INDIFFERENT, OR HAVE NO PREFERENCE BETWEEN THE TWO OPTIONS.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

HERE IS AN EXAMPLE OF HOW THE OTHER TYPE OF CHOICE SITUATION CONSTRUCTED OF TWO CHANCE OPTIONS IS DISPLAYED.

OPTION1		OPTION 2
.50	50	.75
.50	45	-
-	40	.25

IF YOU TAKE OPTION 1 THERE IS A 50 PERCENT PROBABILITY THAT YOU'LL GET 50, AND A 50 PERCENT PROBABILITY YOU'LL GET 45.

IF YOU TAKE OPTION 2 THERE IS A 75 PERCENT PROBABILITY THAT YOU'LL GET 50, AND A 25 PERCENT CHANCE YOU'LL GET 40.

OPTION 2, THEREFORE, OFFERS YOU A BETTER CHANCE AT THE MOST PREFERRED OUTCOME, 50, BUT AT THE SAME TIME PRESENTS THE POSSIBILITY THAT YOU'LL GET THE LEAST PREFERRED OUTCOME, 40.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

THIS PROCEDURE IS CALLED THE LOCAL COHERENCE ASSESSMENT PROCEDURE BECAUSE IT CONSIDERS CHOICE SITUATIONS OF BOTH TYPES INVOLVING THE SAME THREE OUTCOMES AND REQUIRES THAT YOUR PREFERENCES IN BOTH TYPES OF SITUATION BE COHERENT IN AN EXPECTED UTILITY SENSE.

ONE OF THE REASON FOR USING THIS PROCEDURE IS THAT IT TENDS TO POINT OUT AND ALLOW YOU TO CORRECT FOR BIASES THAT OFTEN PRESENT IN PROCEDURES THAT ONLY USE CHOICE SITUATIONS INVOLVING A FOR SURE AND A CHANCE OPTION.

THIS COMPLETES THE EXPLANATION OF THIS PROCEDURE.

IF YOU WANT TO USE THIS PROCEDURE, TYPE '1', ELSE '0'.?1

```
WE NOW WANT YOU TO SPECIFY SEVERAL OF THE OUTCOMES TO WHICH
YOU WANT TO ASSIGN UITLITIES.

YOU CAN SPECIFY EITHER FIVE, SEVEN OR NINE OUTCOMES. YOU
YOU SHOULD SPECIFY THE SMALLEST AND LARGEST OUTCOMES AND
THREE, FIVE OR SEVEN OUTCOMES IN BETWEEN.

HOW MANY OUTCOMES DO YOU WANT TO SPECIFY (5,7,OR 9) ?5
```

```
PLEASE SPECIFY 5 OUTCOMES BEGINNING WITH THE SMALLEST.

FOR DISPLAY PURPOSES WE MUST ASK YOU TO SCALE YOUR OUTCOMES
SO THAT THEY ALL FALL IN THE RANGE -999.99 TO 999.99.

WHAT IS YOUR SMALLEST OUTCOME ?0

WHAT IS YOUR LARGEST OUTCOME ?4
```

```
NOW SPECIFY THE OTHER 3 OUTCOMES BEGINNING WITH THE
NEXT TO SMALLEST OUTCOME OR OUTCOME 2.

SMALLEST =          0.00    LARGEST =        4.00

OUTCOME  2       = ?1
OUTCOME  3       = ?2
OUTCOME  4       = ?3
```

```
HERE IS WHAT YOU ENTERED.

   OUTCOME 1 =       0.00
   OUTCOME 2 =       1.00
   OUTCOME 3 =       2.00
   OUTCOME 4 =       3.00
   OUTCOME 5 =       4.00

DID YOU ENTER THE OUTCOMES CORRECTLY (NO=0 YES=1)?1
```

```
PLEASE INDICATE FOR THE P VALUES PRESENTED IF YOU PREFER
THE FOR SURE OR THE CHANCE OPTION BELOW.

     ----------------------------
    I                            I
    I        3.00   P   CHANCE   I   INDIFFERENT=0
    I        2.00       FOR SURE I   FOR SURE   =1
    I        0.00  1-P  CHANCE   I   CHANCE     =2
    I                            I   RESTART    =3
     ----------------------------
IF YOU ARE INDIFFERENT BETWEEN THE OPTIONS, TYPE '0'.
IF YOU PREFER THE FOR SURE OPTION,          TYPE '1'.
IF YOU PREFER THE CHANCE OPTION,            TYPE '2'.
IF YOU WANT TO RESTART THE QUESTIONING,     TYPE '3'.

      WHICH WOULD YOU PREFER IF          P =  .25        ?1
      WHICH WOULD YOU PREFER IF          P =  .8         ?2
      WHICH WOULD YOU PREFER IF          P =  .35        ?1
      WHICH WOULD YOU PREFER IF          P =  .65        ?2
      WHICH WOULD YOU PREFER IF          P =  .5         ?1
      WHICH WOULD YOU PREFER IF          P =  .55        ?0
```

```
YOUR INDIFFERENCE BETWEEN THE FOR SURE AND CHANCE OPTIONS
IN SITUATION 1 BELOW IMPLIES THAT YOU ARE ALSO INDIFFERENT
BETWEEN THE TWO CHANCE OPTIONS IN SITUATION 2.

        SITUATION 1                         SITUATION 2
  --------------------------          ---------------------------
I                          I          I OPTION 1         OPTION 2 I
I       3.00  .55 CHANCE   I          I   .27     3.00      -     I
I       2.00      FOR SURE I          I    -      2.00     .50    I
I       0.00  .45 CHANCE   I          I   .73     0.00     .50    I
  --------------------------          ---------------------------

ARE YOU INDIFFERENT IN SITUATION 2 (NO=0 YES=1) ?1
```

```
PLEASE INDICATE FOR THE P VALUES PRESENTED IF YOU PREFER
THE FOR SURE OR THE CHANCE OPTION BELOW.

      -----------------------------
      I                              I
      I        4.00   P    CHANCE    I   INDIFFERENT=0
      I        3.00        FOR SURE  I   FOR SURE   =1
      I        2.00  1-P   CHANCE    I   CHANCE     =2
      I                              I   RESTART    =3
      -----------------------------

IF YOU ARE INDIFFERENT BETWEEN THE OPTIONS, TYPE '0'.
IF YOU PREFER THE FOR SURE OPTION,          TYPE '1'.
IF YOU PREFER THE CHANCE OPTION,            TYPE '2'.
IF YOU WANT TO RESTART THE QUESTIONING,     TYPE '3'.

      WHICH WOULD YOU PREFER IF          P =  .35          ?1
      WHICH WOULD YOU PREFER IF          P =  .5           ?1
      WHICH WOULD YOU PREFER IF          P =  .85          ?2
      WHICH WOULD YOU PREFER IF          P =  .55          ?1
      WHICH WOULD YOU PREFER IF          P =  .7           ?2
      WHICH WOULD YOU PREFER IF          P =  .6           ?0
```

```
YOUR INDIFFERENCE BETWEEN THE FOR SURE AND CHANCE OPTIONS
IN SITUATION 1 BELOW IMPLIES THAT YOU ARE ALSO INDIFFERENT
BETWEEN THE TWO CHANCE OPTIONS IN SITUATION 2.

         SITUATION 1                         SITUATION 2
  --------------------------         ----------------------------
I                          I         I OPTION 1          OPTION 2 I
I       4.00  .60 CHANCE   I         I   .15      4.00      -     I
I       3.00      FOR SURE I         I    -       3.00     .25    I
I       2.00  .40 CHANCE   I         I   .85      2.00     .75    I
  --------------------------         ----------------------------

ARE YOU INDIFFERENT IN SITUATION 2 (NO=0 YES=1) ?1
```

264

```
PLEASE INDICATE FOR THE P VALUES PRESENTED IF YOU PREFER
THE FOR SURE OR THE CHANCE OPTION BELOW.

      ------------------------------
      I                             I
      I        2.00    P   CHANCE   I   INDIFFERENT=0
      I        1.00        FOR SURE I   FOR SURE    =1
      I        0.00  1-P   CHANCE   I   CHANCE      =2
      I                             I   RESTART     =3
      ------------------------------
IF YOU ARE INDIFFERENT BETWEEN THE OPTIONS, TYPE '0'.
IF YOU PREFER THE FOR SURE OPTION,          TYPE '1'.
IF YOU PREFER THE CHANCE OPTION,            TYPE '2'.
IF YOU WANT TO RESTART THE QUESTIONING,     TYPE '3'.

      WHICH WOULD YOU PREFER IF           P =  .7          ?2
      WHICH WOULD YOU PREFER IF           P =  .5          ?0
```

```
YOUR INDIFFERENCE BETWEEN THE FOR SURE AND CHANCE OPTIONS
IN SITUATION 1 BELOW IMPLIES THAT YOU ARE ALSO INDIFFERENT
BETWEEN THE TWO CHANCE OPTIONS IN SITUATION 2.

         SITUATION 1                       SITUATION 2
  --------------------------        ---------------------------
I                          I        I OPTION 1          OPTION 2 I
I       2.00  .50 CHANCE   I        I   .25       2.00     -     I
I       1.00      FOR SURE I        I    -        1.00    .50    I
I       0.00  .50 CHANCE   I        I   .75       0.00    .50    I
  --------------------------        ---------------------------

ARE YOU INDIFFERENT IN SITUATION 2 (NO=0 YES=1) ?1
```

```
HERE ARE A SET OF UTILITIES CONSISTENT WITH YOUR RESPONSES.

        OUTCOME    UTILITY
          0.00       0.00
          1.00       0.21
          2.00       0.42
          3.00       0.77
          4.00       1.00

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1
```

```
HERE ARE SEVERAL OPTIONS YOU MAY FIND HELPFUL IN
EVALUATING THE ASSESSED UTILITY FUNCTION.

 1. DISPLAY THE ASSESSED UTILITIES AND THOSE IMPLIED
    BY ANY FITTED PARAMETRIC FUNCTION
 2. DISPLAY THE INDIFFERENCE PROBABILITIES FOR CHOICE
    SITUATIONS THAT ARE IMPLIED BY THE ASSESSED UTILITIES
    AND ANY FITTED PARAMETRIC FUNCTIONS
 3. DISPLAY A GRAPH OF THE ASSESSED UTILITIES OR OF ANY
    UTILITIES DETERMINED BY A FITTED PARAMETRIC FUNCTION
 4. FIT NORMAL AND STUDENT'S T CDF TO ASSESSED UTILITIES
 5. FIT A GENERALIZED BETA CDF TO ASSESSED UTILITIES
 6. COMPUTE EXPECTED UTILITIES

TYPE THE NUMBER OF THE OPTION YOU WANT (EXIT=0)?0
```

MODEL 1. ASSESSMENT OF UTILITIES

1. FIXED STATE LEAST SQUARES ASSESSMENT
2. REGIONAL COHERENCE ASSESSMENT
3. LOCAL COHERENCE ASSESSMENT

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0

COMPONENT 31. UTILITIES AND EXPECTED UTILITIES

1. ASSESSMENT OF UTILITIES
2. EVALUATION OF UTILITIES

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?2

MODEL 2. EVALUATION OF UTILITIES

1. ENTRY OF OUTCOMES AND UTILITIES
2. ANALYSIS OF UTILITIES

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1

THESE ARE THE UTILITIES IN YOUR PERSONAL FILE, THEY WILL BE REFERRED TO AS YOUR ASSESSED LEAST SQUARE UTILITIES

OUTCOME	UTILITY
0.00	0.00
1.00	0.21
2.00	0.42
3.00	0.77
4.00	1.00

IF YOU WANT TO EVALUATE THESE UTILITIES TYPE '1'
TO EVALUATE ANOTHER UTILITIES TYPE '2'
?2

```
YOUR PERSONAL FILE DOES NOT CONTAIN THE VALUES OF THE OUTCOMES
AND THE UTILITIES OF THESE OUTCOMES THAT YOU WANT TO ANALYSIS

TO EVALUATE A UTILITY FUNCTION IT IS NECESSARY TO HAVE THIS

       IF YOU HAVE THIS INFORMATION, YOU CAN NOW ENTER IT.

       IF YOU DO NOT, THEN YOU SHOULD FIRST GO THROUGH ONE OF THE
        ASSESSMENT PROCEDURES.

                     TO ENTER THE INFORMATION, TYPE '1'.
                     TO ASSESS YOUR UTILITIES, TYPE '2'.
                                   TO EXIT, TYPE '0'.?1
```

```
FOR DISPLAY PURPOSES IT IS NECESSARY THAT WE ASK YOU TO OBSERVE
THE FOLLOWING CONSTRAINTS REGARDING THE OUTCOMES AND UTILITIES.
     1. OUTCOMES MUST BE EXPRESSIBLE IN XXX.XX FORMAT
        (3 SIGNIFICANT DIGITS TO THE LEFT, AND 2 TO THE
        RIGHT OF THE DECIMAL POINT)
     2. ASSIGN THE SMALLEST OUTCOME UTILITY 0, THE LARGEST
        UTILITY 1, AND THE OTHERS UTILITIES BETWEEN 0 AND 1.

IT IS, OF COURSE, ASSUMED THAT THE LARGER THE OUTCOME THE
THE LARGER THE ASSOCIATED UTILITY.

YOU MAY ENTER UTILITIES FOR EITHER 5, 7 OR 9 DIFFERENT OUTCOMES.

FOR HOW MANY OUTCOMES DO YOU WISH TO PROVIDE UTILITIES?9
```

```
PLEASE ENTER THE UTILITIES FOR THE  9 DIFFERENT OUTCOMES.

WHAT IS THE SMALLEST OUTCOME, THE ONE TO BE ASSIGNED UTILITY 0 ?0

WHAT IS THE LARGEST OUTCOME, THE ONE TO BE ASSIGNED UTILITY 1 ?4
```

```
SMALLEST OUTCOME =      0.00     LARGEST OUTCOME =      4.00

NOW ENTER THE OTHER OUTCOME VALUES AND ASSOCIATED UTILITIES.
    START WITH THE NEXT TO SMALLEST OUTCOME (OUTCOME 2).

ENTER THE OUTCOME VALUE AND ITS UTILITY SEPARATED BY COMMAS.

OUTCOME  2     (OUTCOME VALUE,UTILITY)  ?0.5,.10
OUTCOME  3     (OUTCOME VALUE,UTILITY)  ?1.0,.25
OUTCOME  4     (OUTCOME VALUE,UTILITY)  ?1.5,.45
OUTCOME  5     (OUTCOME VALUE,UTILITY)  ?2.0,.70
OUTCOME  6     (OUTCOME VALUE,UTILITY)  ?2.5,.85
OUTCOME  7     (OUTCOME VALUE,UTILITY)  ?3.0,.95
OUTCOME  8     (OUTCOME VALUE,UTILITY)  ?3.5,.99
```

```
HERE IS WHAT YOU ENTERED.

          OUTCOME     UTILITY
            0.00        0.00
            0.50        0.10
            1.00        0.25
            1.50        0.45
            2.00        0.70
            2.50        0.85
            3.00        0.95
            3.50        0.99
            4.00        1.00

THESE UTILITIES WILL BE REFERRED TO AS YOUR ASSESSED
              LEAST  SQUARE  UTILITIES

DID YOU ENTER EVERYTHING CORRECTLY (NO=0 YES=1) ?1
```

```
HERE ARE SEVERAL OPTIONS YOU MAY FIND HELPFUL IN
EVALUATING THE ASSESSED UTILITY FUNCTION.

 1. DISPLAY THE ASSESSED UTILITIES AND THOSE IMPLIED
    BY ANY FITTED PARAMETRIC FUNCTION
 2. DISPLAY THE INDIFFERENCE PROBABILITIES FOR CHOICE
    SITUATIONS THAT ARE IMPLIED BY THE ASSESSED UTILITIES
    AND ANY FITTED PARAMETRIC FUNCTIONS
 3. DISPLAY A GRAPH OF THE ASSESSED UTILITIES OR OF ANY
    UTILITIES DETERMINED BY A FITTED PARAMETRIC FUNCTION
 4. FIT NORMAL AND STUDENT'S T CDF TO ASSESSED UTILITIES
 5. FIT A GENERALIZED BETA CDF TO ASSESSED UTILITIES
 6. COMPUTE EXPECTED UTILITIES

TYPE THE NUMBER OF THE OPTION YOU WANT (EXIT=0)?5
```

FITTING GENERALIZED BETA TO ASSESSED UTILITIES

HERE IS A BRIEF DESCRIPTION OF THE FITTING PROCEDURE.

THE ENTIRE GENERALIZED BETA CDF IS FITTED TO THE LEAST SQUARE UTILITIES YOU SPECIFIED.

THREE DIFFERENT FITS ARE FOUND USING THE FRACTILE ASSESSMENT PROCEDURES (FASP) AS IN THE BETA PRIOR DISTRIBUTION OF THE BETA-BINOMIAL MODEL.

ESTIMATES OF THE 25TH, 50TH AND 75TH FRACTILES ARE FOUND USING THE ASSESSED UTILITIES AND LINEAR INTERPOLATION.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

HERE ARE THE ASSESSED UTILITIES AND THE THREE FITTED GENERALIZED BETA CDF FUNCTIONS. UTILITIES HAVE BEEN MULTIPLIED BY 100 TO ENHANCE THE READABILITY OF THE DISPLAY.

		P A R A M E T E R S		
		----1---	----2---	----3---
PARAMETERS	A=	2.11	2.60	2.35
	B=	2.99	3.73	3.36

		U T I L I T I E S					
		----1---		----2---		----3---	
OUTCOME	ASS'D	FIT	DIFF	FIT	DIFF	FIT	DIFF
0.00	0	0	0	0	0	0	0
0.50	10	7	3	5	5	6	4
1.00	25	24	1	21	4	22	3
1.50	45	45	-0	45	0	45	-0
2.00	70	67	3	69	1	68	2
2.50	85	84	1	86	-1	85	-0
3.00	95	94	1	96	-1	95	-0
3.50	99	99	-0	100	-1	99	-0
4.00	100	100	0	100	0	100	0

TYPE '1' TO CONTINUE.?1

HERE ARE THE OPTIONS AVAILABLE FOR INVESTIGATING THE FITTED GENERALIZED BETA DISTRIBUTIONS.

1. DISPLAY ASSESSED AND FITTED BETA UTILITIES
2. DISPLAY THE INDIFFERENCE PROBABILITIES FOR SELECTED CHOICE SITUATIONS IMPLIED BY THE ASSESSED AND FITTED BETA UTILITIES
3. DISPLAY THE INDIFFERENCE PROBABILITIES FOR CHOICE SITUATIONS IMPLIED BY THE ASSESSED AND FITTED BETA UTILITIES
4. GRAPH ASSESSED OR FITTED BETA UTILITIES
5. SELECT ONE OF THE BETA FITS FOR YOUR UTILITY FUNCTION

WHICH OPTION DO YOU WANT (EXIT=0) ?1

HERE ARE THE ASSESSED UTILITIES AND THE THREE FITTED GENERALIZED BETA CDF FUNCTIONS. UTILITIES HAVE BEEN MULTIPLIED BY 100 TO ENHANCE THE READABILITY OF THE DISPLAY.

		P A R A M E T E R S		
		----1---	----2---	----3---
PARAMETERS	A=	2.11	2.60	2.35
	B=	2.99	3.73	3.36

		U T I L I T I E S					
		----1---		----2---		----3---	
OUTCOME	ASS'D	FIT	DIFF	FIT	DIFF	FIT	DIFF
0.00	0	0	0	0	0	0	0
0.50	10	7	3	5	5	6	4
1.00	25	24	1	21	4	22	3
1.50	45	45	-0	45	0	45	-0
2.00	70	67	3	69	1	68	2
2.50	85	84	1	86	-1	85	-0
3.00	95	94	1	96	-1	95	-0
3.50	99	99	-0	100	-1	99	-0
4.00	100	100	0	100	0	100	0

TYPE '1' TO CONTINUE.?1

HERE ARE THE OPTIONS AVAILABLE FOR INVESTIGATING THE FITTED GENERALIZED BETA DISTRIBUTIONS.

1. DISPLAY ASSESSED AND FITTED BETA UTILITIES
2. DISPLAY THE INDIFFERENCE PROBABILITIES FOR SELECTED CHOICE SITUATIONS IMPLIED BY THE ASSESSED AND FITTED BETA UTILITIES
3. DISPLAY THE INDIFFERENCE PROBABILITIES FOR CHOICE SITUATIONS IMPLIED BY THE ASSESSED AND FITTED BETA UTILITIES
4. GRAPH ASSESSED OR FITTED BETA UTILITIES
5. SELECT ONE OF THE BETA FITS FOR YOUR UTILITY FUNCTION

WHICH OPTION DO YOU WANT (EXIT=0) ?5

PARAMETERS	A=	2.11	2.60	2.35
	B=	2.99	3.73	3.36

		U T I L I T I E S					
		----1---		----2---		----3---	
OUTCOME	ASS'D	FIT	DIFF	FIT	DIFF	FIT	DIFF
0.00	0	0	0	0	0	0	0
0.50	10	7	3	5	5	6	4
1.00	25	24	1	21	4	22	3
1.50	45	45	-0	45	0	45	-0
2.00	70	67	3	69	1	68	2
2.50	85	84	1	86	-1	85	-0
3.00	95	94	1	96	-1	95	-0
3.50	99	99	-0	100	-1	99	-0
4.00	100	100	0	100	0	100	0

TYPE '1' TO CONTINUE.?1

THE PARAMETERS OF THE GENERALIZED BETA YOU SELECT WILL BE STORED IN YOUR PERSONAL FILE. THIS WILL MAKE IT POSSIBLE FOR YOU TO CALCULATE EXPECTED UTILITIES USING THIS GENERALIZED BETA DISTRIBUTION.

TYPE THE NUMBER OF THE FIT YOU WANT (NONE=0) ?1

PARAMETERS OF STORED FIT: A = 2.11 B = 2.99

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

```
HERE ARE SEVERAL OPTIONS YOU MAY FIND HELPFUL IN
EVALUATING THE ASSESSED UTILITY FUNCTION.

 1. DISPLAY THE ASSESSED UTILITIES AND THOSE IMPLIED
    BY ANY FITTED PARAMETRIC FUNCTION
 2. DISPLAY THE INDIFFERENCE PROBABILITIES FOR CHOICE
    SITUATIONS THAT ARE IMPLIED BY THE ASSESSED UTILITIES
    AND ANY FITTED PARAMETRIC FUNCTIONS
 3. DISPLAY A GRAPH OF THE ASSESSED UTILITIES OR OF ANY
    UTILITIES DETERMINED BY A FITTED PARAMETRIC FUNCTION
 4. FIT NORMAL AND STUDENT'S T CDF TO ASSESSED UTILITIES
 5. FIT A GENERALIZED BETA CDF TO ASSESSED UTILITIES
 6. COMPUTE EXPECTED UTILITIES

TYPE THE NUMBER OF THE OPTION YOU WANT (EXIT=0)?6
```

```
HERE ARE THE TYPES OF DISTRIBUTION WITH RESPECT TO WHICH
YOU CAN TAKE THE EXPECTATION.

     1. NORMAL
     2. STUDENT'S T
     3. GENERALIZED BETA

TYPE THE NUMBER OF THE TYPE OF DISTRIBUTION WITH RESPECT
TO WHICH YOU WANT TO TAKE THE EXPECTATION (EXIT=0)?3

THE GENERALIZED BETA DISTRIBUTION IS ASSUMED TO BE DEFINED
OVER THE SAME INTERVAL AS YOUR UTILITIES.

PLEASE ENTER THE A AND B PARAMETERS OF THE BETA.

WHAT IS A ?3

WHAT IS B ?3
```

THERE WILL BE A PAUSE FOR CALCULATIONS.

EXPECTATION WITH RESPECT TO GENERALIZED BETA DISTRIBUTION.

PARAMETERS: A =   3.00   B =   3.00

ASSESSED = 0.643

GENERALIZED BETA = 0.632

A = 2.11

B = 2.99

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

```
HERE ARE THE TYPES OF DISTRIBUTION WITH RESPECT TO WHICH
YOU CAN TAKE THE EXPECTATION.

     1. NORMAL
     2. STUDENT'S T
     3. GENERALIZED BETA

TYPE THE NUMBER OF THE TYPE OF DISTRIBUTION WITH RESPECT
TO WHICH YOU WANT TO TAKE THE EXPECTATION (EXIT=0)?0
```

```
HERE ARE SEVERAL OPTIONS YOU MAY FIND HELPFUL IN
EVALUATING THE ASSESSED UTILITY FUNCTION.

 1. DISPLAY THE ASSESSED UTILITIES AND THOSE IMPLIED
    BY ANY FITTED PARAMETRIC FUNCTION
 2. DISPLAY THE INDIFFERENCE PROBABILITIES FOR CHOICE
    SITUATIONS THAT ARE IMPLIED BY THE ASSESSED UTILITIES
    AND ANY FITTED PARAMETRIC FUNCTIONS
 3. DISPLAY A GRAPH OF THE ASSESSED UTILITIES OR OF ANY
    UTILITIES DETERMINED BY A FITTED PARAMETRIC FUNCTION
 4. FIT NORMAL AND STUDENT'S T CDF TO ASSESSED UTILITIES
 5. FIT A GENERALIZED BETA CDF TO ASSESSED UTILITIES
 6. COMPUTE EXPECTED UTILITIES

TYPE THE NUMBER OF THE OPTION YOU WANT (EXIT=0)?0
```

MODEL 2. EVALUATION OF UTILITIES

1. ENTRY OF OUTCOMES AND UTILITIES
2. ANALYSIS OF UTILITIES

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0

COMPONENT 31. UTILITIES AND EXPECTED UTILITIES

1. ASSESSMENT OF UTILITIES
2. EVALUATION OF UTILITIES

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?0

```
COMPONENT GROUP 3.  DECISION THEORETIC MODELS

31.  UTILITIES AND EXPECTED UTILITIES
32.  EDUCATIONAL AND EMPLOYMENT SELECTION
33.  SELECTION OF EDUCATIONAL TREATMENT

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?32
```

```
      COMPONENT 32.  EDUCATIONAL AND EMPLOYMENT SELECTION

           1. QUOTA-FREE SELECTION (ONE GROUP)
           2. RESTRICTED SELECTION (TWO GROUPS)

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?1
```

MODEL 1. QUOTA-FREE SELECTION

1. ASSESSMENT OF THRESHOLD UTILITIES
2. DETERMINATION OF PREDICTOR CUT SCORES

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1

THRESHOLD UTILITY ASSESSMENT

THRESHOLD UTILITY FUNCTIONS ARE APPROPRIATE WHEN THE THE OUTCOME OF SELECTION CAN BE APPROPRIATELY CATEGORIZED AS EITHER SUCCESS OR FAILURE.

YOUR SELECTION DECISION CAN LEAD TO ONE OF FOUR POSSIBILITIES.

1. AN APPLICANT IS ACCEPTED AND SUCCEEDS.
2. AN APPLICANT IS REJECTED WHO WOULD HAVE SUCCEEDED HAD HE BEEN ACCEPTED.
3. AN APPLICANT IS REJECTED WHO WOULD HAVE FAILED HAD HE BEEN ACCEPTED.
4. AN APPLICANT IS ACCEPTED AND FAILS.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

SUPPOSE IT COULD EITHER BE ARRANGED THAT YOUR NEXT DECISION WOULD BE TO ACCEPT A QUALIFIED APPLICANT OR ARRANGED THAT YOUR NEXT DECISION WOULD BE TO REJECT AN UNQUALIFIED APPLICANT.

1. ARRANGEMENT TO ACCEPT QUALIFIED APPLICANT
2. ARRANGEMENT TO REJECT UNQUALIFIED APPLICANT
3. NO PREFERENCE BETWEEN THE TWO ARRANGEMENTS

DISREGARD ANY COST IN MAKING THIS ARRANGEMENT.

TYPE THE NUMBER OF THE ARRANGEMENT YOU PREFER ?1

SUPPOSE IT COULD EITHER BE ARRANGED THAT YOUR NEXT DECISION WOULD BE TO ACCEPT AN UNQUALIFIED APPLICANT OR ARRANGED THAT YOUR NEXT DECISION WOULD BE TO REJECT A QUALIFIED APPLICANT.

1. ARRANGEMENT TO ACCEPT UNQUALIFIED APPLICANT
2. ARRANGEMENT TO REJECT QUALIFIED APPLICANT
3. NO PREFERENCE BETWEEN THE TWO ARRANGEMENTS

DISREGARD ANY COST IN MAKING THIS ARRANGEMENT.

TYPE THE NUMBER OF THE ARRANGEMENT YOU DISLIKE THE LEAST?2

DO YOU WANT TO SKIP THE DETAILED EXPLANATION (NO=0 YES=1)?1

```
IN ASSESSING YOUR UTILITIES WE SHALL DISPLAY THE ARRANGEMENT
POSSIBILITIES IN THE FOLLOWING WAY.

        P          ACCEPT    APPLICANT WHO IS QUALIFIED

   FOR SURE        REJECT    APPLICANT WHO IS UNQUALIFIED

      1-P          ACCEPT    APPLICANT WHO IS UNQUALIFIED

THE OUTCOMES PROCEEDED BY P AND 1-P ARE THE OUTCOMES POSSIBLE
UNDER THE CHANCE ARRANGEMENT.

VARIOUS VALUES OF P WILL BE DISPLAYED AND YOU ARE TO INDICATE
FOR EACH WHICH OF THE ARRANGEMENTS YOU WOULD PREFER BY USING
THE RESPONSE KEY SHOWN BELOW.  IF YOU MAKE A MISTAKE RESPOND-
ING YOU CAN RESTART THE INTERROGATION BY TYPING '3'.

KEY: NO PREFERENCE=0  FOR SURE=1  CHANCE=2  RESTART=3

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1
```

```
CONSIDER CAREFULLY THE FOLLOWING CHOICE BETWEEN A FOR SURE AND
A CHANCE OPTION

        P          ACCEPT    APPLICANT WHO IS QUALIFIED

   FOR SURE        REJECT    APPLICANT WHO IS UNQUALIFIED

      1-P          ACCEPT    APPLICANT WHO IS UNQUALIFIED

KEY: NO PREFERENCE=0  FOR SURE=1  CHANCE=2  RESTART=3

WHICH OPTION WOULD YOU PREFER IF P WERE 0.50?1
WHICH OPTION WOULD YOU PREFER IF P WERE 0.70?1
WHICH OPTION WOULD YOU PREFER IF P WERE 0.80?0
```

CONSIDER CAREFULLY THE FOLLOWING CHOICE BETWEEN A FOR SURE AND A CHANCE OPTION

P	ACCEPT	APPLICANT WHO IS QUALIFIED
FOR SURE	REJECT	APPLICANT WHO IS QUALIFIED
1-P	ACCEPT	APPLICANT WHO IS UNQUALIFIED

KEY: NO PREFERENCE=0 FOR SURE=1 CHANCE=2 RESTART=3

WHICH OPTION WOULD YOU PREFER IF P WERE 0.40?2
WHICH OPTION WOULD YOU PREFER IF P WERE 0.20?0

HERE ARE THE INDIFFERENCE PROBABILITIES YOU SPECIFIIED FOR ACCEPTING AN APPLICANT.

	P	1-P	FOR SURE	P
1	0.80	ACCEPT UNQUALIFIED	REJECT UNQUALIFIED	ACCEPT QUALIFIED
2	0.20	ACCEPT UNQUALIFIED	REJECT QUALIFIED	ACCEPT QUALIFIED

THE INDIFFERENCE PROBABILITIES FOR CHOICE SITUATIONS 1 AND 2 IMPLY THE FOLLOWING INDIFFERENCE PROBABILITIES.

3	0.75	REJECT QUALIFIED	REJECT UNQUALIFIED	ACCEPT QUALIFIED
4	0.25	ACCEPT UNQUALIFIED	REJECT QUALIFIED	REJECT UNQUALIFIED

ARE THESE INDIFFERENCE PROBABILITIES ACCEPTABLE (NO=0 YES=1)?1

HERE ARE THE THRESHOLD UTILITY STRUCTURE WHERE THE MOST PREFERRED DECISION HAS BEEN ASSIGNED UTILITY 1 AND THE LEAST PREFERRED UTILITY 0.

	REJECT	ACCEPT
SUCCEED	0.20	1.00
FAIL	0.80	0.00

TYPE THE NUMBER OF OPTION YOU WANT
1. ACCEPT THE THRESHOLD UTILITY
2. MODIFY THE INDIFFERENCE PROBABILITIES
3 REEXPRESS THE INDIFFERENCE PROBABILITIES
4. RESTART THE ASSESSMENT PROCEDURE

?1

TYPE THE NUMBER OF OPTION YOU WANT

1. DETERMINE THE CUT SCORE(SINGLE PREDICTOR)
2. EXIT THE MODULE

?1

OPTIMAL SELECTION USING THRESHOLD UTILITY

THIS MODULE DETERMINES THE PREDICTOR CUT SCORE FOR YOUR SELECTION PROBLEM BASED ON YOUR THRESHOLD UTILITY FUNCTION AND YOUR PREDICTION EQUATION.

ANY APPLICANT WHOSE PREDICTOR SCORE IS EQUAL TO OR GREATER THAN THIS CUT SCORE SHOULD BE SELECTED.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

HERE IS THE UTILITY FUNCTION IN YOUR PERSONAL FILE.

```
               I---------- DECISION -----------I
               I   REJECT     I       ACCEPT   I
I---OUTCOME---I--------------I----------------I
I             I              I                I
I SUCCESSFUL  I    0.20      I       1.00     I
I             I              I                I
I             I--------------I----------------I
I             I              I                I
I UNSUCCESSFULI    0.80      I       0.00     I
I             I              I                I
I-------------I--------------I----------------I
```

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

```
TO CARRY OUT THE ANALYSIS, YOU MUST PROVIDE (ESTIMATE OF)
THE PARAMETERS OF THE REGRESSION EQUATIONS.  IN MANY CASES
THIS MAY COMES DIRECTLY FROM A SAMPLE OR THEY MAY BE
OBTAINED FROM A FITTED PRIOR DISTRIBUTION.

THE REGRESSION(PREDICTION) EQUATIONS CAN BE OBTAINED FROM
BAYESIAN REGRESSION MODEL IN COMPONENT 24 OR 25.


WHEN YOU ARE READY TO CONTINUE        TYPE '1'?1
```

```
HERE ARE THE OPTIONS TO ENTER THE REGRESSION EQUATION.

   1.  USE THE REGRESSION EQUATION FROM PERSONAL FILE.
   2.  ENTER THE REGRESSION EQUATION FROM TERMINAL.
   3.  ENTER THE SUFFICIENT STATISTICS FROM TERMINAL.
   4.  USE A SAMPLE DATA TO SEE THE ANALYSIS.
   5.  GO THROUGH BAYESIAN REGRESSION COMPONENTS AND
       COMPUTE THE PARAMETERS OF PREDICTION EQUATIONS.
   6.  EXIT THE MODULE.
?4
```

```
HERE ARE THE SAMPLE DATA.

1. SAMPLE SIZE                 N         105
2. MEAN OF PREDICTOR           X.         19.1300
3. ST. DEV. OF PREDICTOR       S.D.X       5.1327
4. MEAN OF CRITERION           Y.          2.2800
5. ST. DEV. OF CRITERION       S.D.Y       0.8962
6. CORRELATION COEFFICIENT R               0.4875
7. INTERCEPT                   ALPHA       0.6515
8. SLOPE                       BETA        0.0851
9. RESIDUAL VARIANCE                       0.6242

IF THESE ARE THE DATA YOU WANT TYPE '1', ELSE '0'.?1

WHAT IS THE SMALLEST POSSIBLE PREDICTOR SCORE ?0
WHAT IS THE LARGEST POSSIBLE PREDICTOR SCORE ?36

WHAT IS THE MINIMUM SUCCESSFUL CRITERION SCORE FOR SELECTION?2
```

```
              I---------- DECISION -----------I
              I   REJECT      I      ACCEPT   I
I---OUTCOME---I---------------I---------------I
I             I               I               I
I SUCCESSFUL  I    0.20       I      1.00     I
I             I               I               I
I             I---------------I---------------I
I             I               I               I
I UNSUCCESSFULI    0.80       I      0.00     I
I             I               I               I
I-------------I---------------I---------------I

MINIMUM SUCCESSFUL CRITERION SCORE                   2.00
PROBABILITY OF SUCCESS REQUIRED FOR SELECTION        0.50
MINIMUM PREDICTOR SCORE SELECTED                    15.84

TYPE THE NUMBER OF OPTION YOU WANT
    1.  CHANGE THE UTILITIES
    2.  CHANGE THE MINIMUM SUCCESSFUL CRITERION
    3.  CHANGE THE PREDICTION EQUATION
    4.  EXIT THE MODEL
?1
```

OUTCOME	DECISION: REJECT	DECISION: ACCEPT
SUCCESSFUL	0.20	1.00
UNSUCCESSFUL	0.80	0.00

THE CORRECT DECISIONS ARE
    A - ACCEPT APPLICANT WHO IS SUCCESSFUL
    C - REJECT APPLICANT WHO WOULD HAVE BEEN UNSUCCESSFUL

THE INCORRECT DECISIONS ARE
    B - REJECT APPLICANT WHO WOULD HAVE BEEN SUCCESSFUL
    D - ACCEPT APPLICANT WHO IS UNSUCCESSFUL

WHICH CORRECT DECISION HAS GREATER UTILITY (A=1 C=2 EQUAL=3)?1

WHICH INCORRECT DECISION HAS LESS UTILITY (B=1 D=2 EQUAL=3)?2

REMEMBER THAT

THE CORRECT DECISIONS ARE
    A - ACCEPT APPLICANT WHO IS SUCCESSFUL
    C - REJECT APPLICANT WHO WOULD HAVE BEEN UNSUCCESSFUL

THE INCORRECT DECISIONS ARE
    B - REJECT APPLICANT WHO WOULD HAVE BEEN SUCCESSFUL
    D - ACCEPT APPLICANT WHO IS UNSUCCESSFUL

LET THE FOLLOWING UTILITIES BE ASSIGNED.

    A = 1.00
    D = 0.00

WHAT IS THE UTILITY OF DECISION B?.2
WHAT IS THE UTILITY OF DECISION C?.7

OUTCOME	DECISION: REJECT	DECISION: ACCEPT
SUCCESSFUL	0.20	1.00
UNSUCCESSFUL	0.70	0.00

MINIMUM SUCCESSFUL CRITERION SCORE	2.00
PROBABILITY OF SUCCESS REQUIRED FOR SELECTION	0.47
MINIMUM PREDICTOR SCORE SELECTED	15.06

TYPE THE NUMBER OF OPTION YOU WANT

1. CHANGE THE UTILITIES
2. CHANGE THE MINIMUM SUCCESSFUL CRITERION
3. CHANGE THE PREDICTION EQUATION
4. EXIT THE MODEL

?4

THIS COMPLETES THE ANALYSIS. TYPE '1' TO CONTINUE.?1

MODEL 1. QUOTA-FREE SELECTION

1. ASSESSMENT OF THRESHOLD UTILITIES
2. DETERMINATION OF PREDICTOR CUT SCORES

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0

COMPONENT 32. EDUCATIONAL AND EMPLOYMENT SELECTION

1. QUOTA-FREE SELECTION (ONE GROUP)
2. RESTRICTED SELECTION (TWO GROUPS)

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?2

MODEL 2. RESTRICTED SELECTION

1. ASSESSMENT OF UTILITY STRUCTURES
2. DETERMINATION OF CUT SCORES (SINGLE PREDICTOR)
3. SELECTION OF APPLICANTS FROM AN AVAILABLE DATA SET

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1

RESTRICTED SELECTION FROM TWO GROUPS
WITH
THRESHOLD UTILITY

THE PURPOSE OF THIS MODULE IS TO ASSIST YOU IN ASSESSING YOUR THRESHOLD UTILITY FUNCTIONS FOR THE TWO GROUPS INVOLVED IN YOUR SELECTION PROBLEM.

PLEASE PROVIDE A NAME FOR EACH OF THE GROUPS INVOLVED IN YOUR SELECTION PROBLEM. EACH NAME MAY BE UP TO 6 CHARACTERS LONG.

WHAT NAME DO YOU WANT TO USE FOR THE FIRST GROUP ?ADV

WHAT NAME DO YOU WANT TO USE FOR THE SECOND GROUP ?DISADV

YOU ENTERED ADV AND DISADV.

DID YOU ENTER THE NAMES CORRECTLY (NO=0 YES=1)?1

THRESHOLD UTILITY FUNCTIONS ARE APPROPRIATE WHEN THE THE OUTCOME OF SELECTION CAN BE APPROPRIATELY CATEGORIZED AS EITHER SUCCESS OR FAILURE.

YOUR SELECTION DECISION CAN LEAD TO ONE OF FOUR POSSIBILITIES.

1. AN APPLICANT IS ACCEPTED AND SUCCEEDS.
2. AN APPLICANT IS REJECTED WHO WOULD HAVE SUCCEEDED HAD HE BEEN ACCEPTED.
3. AN APPLICANT IS REJECTED WHO WOULD HAVE FAILED HAD HE BEEN ACCEPTED.
4. AN APPLICANT IS ACCEPTED AND FAILS.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

CONSIDER SELECTION OF APPLICANTS FROM GROUP ADV .

SUPPOSE IT COULD EITHER BE ARRANGED THAT YOUR NEXT DECISION WOULD BE TO ACCEPT A QUALIFIED APPLICANT OR ARRANGED THAT YOUR NEXT DECISION WOULD BE TO REJECT AN UNQUALIFIED APPLICANT.

1. ARRANGEMENT TO ACCEPT QUALIFIED APPLICANT
2. ARRANGEMENT TO REJECT UNQUALIFIED APPLICANT
3. NO PREFERENCE BETWEEN THE TWO ARRANGEMENTS

DISREGARD ANY COST IN MAKING THIS ARRANGEMENT

TYPE THE NUMBER OF THE ARRANGEMENT YOU PREFER ?1

```
SUPPOSE IT COULD EITHER BE ARRANGED THAT YOUR NEXT DECISION
WOULD BE TO ACCEPT AN UNQUALIFIED APPLICANT OR ARRANGED THAT
YOUR NEXT DECISION WOULD BE TO REJECT A QUALIFIED APPLICANT.

     1. ARRANGEMENT TO ACCEPT UNQUALIFIED APPLICANT
     2. ARRANGEMENT TO REJECT QUALIFIED APPLICANT
     3. NO PREFERENCE BETWEEN THE TWO ARRANGEMENTS

DISREGARD ANY COST IN MAKING THIS ARRANGEMENT

TYPE THE NUMBER OF THE ARRANGEMENT YOU DISLIKE THE LEAST?2

DO YOU WANT TO SKIP THE DETAILED EXPLANATION (NO=0 YES=1)?0
```

```
SUPPOSE IT COULD BE ARRANGED THAT YOUR NEXT SELECTION DECISION
WOULD RESULT IN THE REJECTION OF AN UNQUALIFIED APPLICANT.

CONSIDER EXCHANGING THIS ARRANGEMENT FOR ONE THAT WOULD RESULT

WITH PROBABILITY  P  IN ACCEPTING  A  QUALIFIED  APPLICANT AND
WITH PROBABILITY 1-P IN ACCEPTING AN UNQUALIFIED  APPLICANT.

YOUR DECISION TO EXCHANGE OR NOT WOULD DEPEND ON P.

IF P WERE 1, FOR EXAMPLE, YOU WOULD WANT TO MAKE THE EXCHANGE
BECAUSE YOU WOULD ACCEPT A QUALIFIED APPLICANT.

IF P WERE 0, ON THE OTHER HAND, YOU WOULD NOT WANT TO MAKE THE
EXCHANGE SINCE THIS WOULD MEAN YOU WOULD ACCEPT AN UNQUALIFIED
APPLICANT.

THUS IF P WERE 1 YOU WOULD TAKE THE SECOND ARRANGEMENT AND IF P
WERE 0 YOU WOULD TAKE THE FIRST ARRANGEMENT.

WHEN YOU ARE READY TO CONTINUE                         TYPE '1'?1
```

BECAUSE YOU WOULD PREFER THE SECOND ARRANGEMENT IF P WERE 1.00 AND THE FIRST IF P WERE 0.00, IT FOLLOWS THAT THERE MUST BE SOME P BETWEEN 0.00 AND 1.00 FOR WHICH YOU HAVE NO PREFERENCE. WE REFER TO THIS PROBABILITY AS YOUR INDIFFERENCE P (IP).

DETERMINING YOUR INDIFFERENCE PROBABILITIES FOR DIFFERENT PAIRS OF ARRANGEMENTS IS THE BASIC STRATEGY EMPLOYED IN THIS ASSESSMENT PROCEDURE.

RATHER THAN REFERRING TO THE TWO ARRANGEMENTS AS THE FIRST AND SECOND ARRANGEMENTS WE SHALL REFER TO THEM AS THE 'FOR SURE' AND 'CHANCE' ARRANGEMENTS, RESPECTIVELY, TO INDICATE THAT IF YOU TAKE THE FIRST ARRANGEMENT YOU KNOW FOR SURE WHAT WILL HAPPEN, BUT IF YOU TAKE THE SECOND YOU ARE UNCERTAIN AS TO WHICH OF THE TWO POSSIBILITIES WILL HAPPEN.

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

IN ASSESSING YOUR UTILITIES WE SHALL DISPLAY THE ARRANGEMENT POSSIBILITIES IN THE FOLLOWING WAY.

P	ACCEPT	ADV	APPLICANT WHO IS QUALIFIED
FOR SURE	REJECT	ADV	APPLICANT WHO IS UNQUALIFIED
1-P	ACCEPT	ADV	APPLICANT WHO IS UNQUALIFIED

THE OUTCOMES PROCEEDED BY P AND 1-P ARE THE OUTCOMES POSSIBLE UNDER THE CHANCE ARRANGEMENT.

VARIOUS VALUES OF P WILL BE DISPLAYED AND YOU ARE TO INDICATE FOR EACH WHICH OF THE ARRANGEMENTS YOU WOULD PREFER BY USING THE RESPONSE KEY SHOWN BELOW. IF YOU MAKE A MISTAKE RESPONDING YOU CAN RESTART THE INTERROGATION BY TYPING '3'.

KEY: NO PREFERENCE=0 FOR SURE=1 CHANCE=2 RESTART=3

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

CONSIDER CAREFULLY THE FOLLOWING CHOICE BETWEEN A FOR SURE AND A CHANCE OPTION

P	ACCEPT	ADV	APPLICANT WHO IS QUALIFIED
FOR SURE	REJECT	ADV	APPLICANT WHO IS UNQUALIFIED
1-P	ACCEPT	ADV	APPLICANT WHO IS UNQUALIFIED

KEY: NO PREFERENCE=0 FOR SURE=1 CHANCE=2 RESTART=3

WHICH OPTION WOULD YOU PREFER IF P WERE 0.50?1
WHICH OPTION WOULD YOU PREFER IF P WERE 0.70?1
WHICH OPTION WOULD YOU PREFER IF P WERE 0.80?0

CONSIDER CAREFULLY THE FOLLOWING CHOICE BETWEEN A FOR SURE AND A CHANCE OPTION

P	ACCEPT	ADV	APPLICANT WHO IS QUALIFIED
FOR SURE	REJECT	ADV	APPLICANT WHO IS QUALIFIED
1-P	ACCEPT	ADV	APPLICANT WHO IS UNQUALIFIED

KEY: NO PREFERENCE=0 FOR SURE=1 CHANCE=2 RESTART=3

WHICH OPTION WOULD YOU PREFER IF P WERE 0.40?2
WHICH OPTION WOULD YOU PREFER IF P WERE 0.20?0

```
HERE ARE THE INDIFFERENCE PROBABILITIES YOU SPECIFIIED FOR
ACCEPTING AN APPLICANT.

     P          1-P                    FOR SURE              P

1 0.80   ACCEPT UNQUALIFIED  REJECT UNQUALIFIED  ACCEPT QUALIFIED
2 0.20   ACCEPT UNQUALIFIED  REJECT QUALIFIED    ACCEPT QUALIFIED

THE INDIFFERENCE PROBABILITIES FOR CHOICE SITUATIONS 1 AND 2
IMPLY THE FOLLOWING INDIFFERENCE PROBABILITIES.

3 0.75   REJECT QUALIFIED    REJECT UNQUALIFIED  ACCEPT QUALIFIED
4 0.25   ACCEPT UNQUALIFIED  REJECT QUALIFIED    REJECT UNQUALIFIED

ARE THESE INDIFFERENCE PROBABILITIES ACCEPTABLE (NO=0 YES=1)?1
```

```
HERE IS THE CONDITIONAL UTILITY STRUCTURE FOR GROUP ADV
WHERE THE MOST PREFERRED DECISION HAS BEEN ASSIGNED UTILITY
1 AND THE LEAST PREFERRED UTILITY 0.

GROUP ADV
                -------------------------
                I           I           I
     SUCCEED    I   0.20    I   1.00    I
                I-----------I-----------I
                I           I           I
        FAIL    I   0.80    I   0.00    I
                -------------------------
                   REJECT      ACCEPT

TYPE THE NUMBER OF OPTION YOU WANT
  1. ACCEPT THE UTILITY AND CONTINUE THE ASSESSMENT
  2. MODIFY THE INDIFFERENCE PROBABILITIES
  3  REEXPRESS THE INDIFFERENCE PROBABILITIES
  4. RESTART THE ASSESSMENT OF GROUP ADV
?1
```

CONSIDER SELECTION OF APPLICANTS FROM GROUP DISADV.

SUPPOSE IT COULD EITHER BE ARRANGED THAT YOUR NEXT DECISION WOULD BE TO ACCEPT A QUALIFIED APPLICANT OR ARRANGED THAT YOUR NEXT DECISION WOULD BE TO REJECT AN UNQUALIFIED APPLICANT.

1. ARRANGEMENT TO ACCEPT QUALIFIED APPLICANT
2. ARRANGEMENT TO REJECT UNQUALIFIED APPLICANT
3. NO PREFERENCE BETWEEN THE TWO ARRANGEMENTS

DISREGARD ANY COST IN MAKING THIS ARRANGEMENT

TYPE THE NUMBER OF THE ARRANGEMENT YOU PREFER ?1

SUPPOSE IT COULD EITHER BE ARRANGED THAT YOUR NEXT DECISION WOULD BE TO ACCEPT AN UNQUALIFIED APPLICANT OR ARRANGED THAT YOUR NEXT DECISION WOULD BE TO REJECT A QUALIFIED APPLICANT.

1. ARRANGEMENT TO ACCEPT UNQUALIFIED APPLICANT
2. ARRANGEMENT TO REJECT QUALIFIED APPLICANT
3. NO PREFERENCE BETWEEN THE TWO ARRANGEMENTS

DISREGARD ANY COST IN MAKING THIS ARRANGEMENT

TYPE THE NUMBER OF THE ARRANGEMENT YOU DISLIKE THE LEAST?2

CONSIDER CAREFULLY THE FOLLOWING CHOICE BETWEEN A FOR SURE AND A CHANCE OPTION

P	ACCEPT	DISADV APPLICANT WHO IS QUALIFIED
FOR SURE	REJECT	DISADV APPLICANT WHO IS UNQUALIFIED
1-P	ACCEPT	DISADV APPLICANT WHO IS UNQUALIFIED

KEY: NO PREFERENCE=0 FOR SURE=1 CHANCE=2 RESTART=3

WHICH OPTION WOULD YOU PREFER IF P WERE 0.50?1
WHICH OPTION WOULD YOU PREFER IF P WERE 0.70?2
WHICH OPTION WOULD YOU PREFER IF P WERE 0.60?0

CONSIDER CAREFULLY THE FOLLOWING CHOICE BETWEEN A FOR SURE AND A CHANCE OPTION

P	ACCEPT	DISADV APPLICANT WHO IS QUALIFIED
FOR SURE	REJECT	DISADV APPLICANT WHO IS QUALIFIED
1-P	ACCEPT	DISADV APPLICANT WHO IS UNQUALIFIED

KEY: NO PREFERENCE=0 FOR SURE=1 CHANCE=2 RESTART=3

WHICH OPTION WOULD YOU PREFER IF P WERE 0.30?0

```
HERE ARE THE INDIFFERENCE PROBABILITIES YOU SPECIFIIED FOR
ACCEPTING AN APPLICANT.

     P            1-P                    FOR SURE                P

1 0.60   ACCEPT UNQUALIFIED  REJECT UNQUALIFIED  ACCEPT QUALIFIED
2 0.30   ACCEPT UNQUALIFIED  REJECT QUALIFIED    ACCEPT QUALIFIED

THE INDIFFERENCE PROBABILITIES FOR CHOICE SITUATIONS 1 AND 2
IMPLY THE FOLLOWING INDIFFERENCE PROBABILITIES.

3 0.43   REJECT QUALIFIED    REJECT UNQUALIFIED  ACCEPT QUALIFIED
4 0.50   ACCEPT UNQUALIFIED  REJECT QUALIFIED    REJECT UNQUALIFIED

ARE THESE INDIFFERENCE PROBABILITIES ACCEPTABLE (NO=0 YES=1)?1
```

```
HERE IS THE CONDITIONAL UTILITY STRUCTURE FOR GROUP DISADV
WHERE THE MOST PREFERRED DECISION HAS BEEN ASSIGNED UTILITY
1 AND THE LEAST PREFERRED UTILITY 0.

GROUP DISADV
                -------------------------
                I           I           I
     SUCCEED    I   0.30    I   1.00    I
                I-----------I-----------I
                I           I           I
        FAIL    I   0.60    I   0.00    I
                -------------------------
                    REJECT      ACCEPT

TYPE THE NUMBER OF OPTION YOU WANT
  1. ACCEPT THE UTILITY AND CONTINUE THE ASSESSMENT
  2. MODIFY THE INDIFFERENCE PROBABILITIES
  3  REEXPRESS THE INDIFFERENCE PROBABILITIES
  4. RESTART THE ASSESSMENT OF GROUP DISADV
?1
```

```
HERE ARE THE UTILITY FUNCTIONS FOR THE TWO GROUPS YOU SPECIFIED
INDEPENDENTLY.  THE FINAL PART OF ASSESSMENT CONSISTS OF JOINTLY
SCALING THE TWO UTILITIES SO THAT THE MOST PREFERED OUTCOME IN
BOTH OF THE GROUPS HAS UTILITY 1 AND THE LEAST PREFERED OUTCOME
HAS UTILITY 0.
GROUP ADV
                -------------------------
                I           I           I
     SUCCEED    I   0.20    I   1.00    I
                I-----------I-----------I
                I           I           I
        FAIL    I   0.80    I   0.00    I
                -------------------------
                    REJECT      ACCEPT
GROUP DISADV
                -------------------------
                I           I           I
     SUCCEED    I   0.30    I   1.00    I
                I-----------I-----------I
                I           I           I
        FAIL    I   0.60    I   0.00    I
                -------------------------
                    REJECT      ACCEPT
WHEN YOU ARE READY TO CONTINUE                 TYPE '1'?1
```

```
SUPPOSE IT COULD BE ARRANGED THAT YOUR NEXT DECISION WOULD BE
TO ACCEPT A QUALIFIED APPLICANT.

WHICH GROUP WOULD YOU PREFER THE APPLICANT TO COME FROM?
     1. FROM GROUP ADV
     2. FROM GROUP DISADV
     3. IT MAKES NO DIFFERENCE.

WHICH OPTION ?2
```

```
SUPPOSE IT COULD BE ARRANGED THAT YOUR NEXT DECISION WOULD BE
TO ACCEPT AN UNQUALIFIED APPLICANT.

WHICH GROUP WOULD YOU PREFER THE APPLICANT TO COME FROM?
     1. FROM GROUP ADV
     2. FROM GROUP DISADV
     3. IT MAKES NO DIFFERENCE.

WHICH OPTION ?2
```

```
CONSIDER CAREFULLY THE FOLLOWING CHOICE BETWEEN A FOR SURE AND
A CHANCE OPTION

      P         ACCEPT  DISADV  APPLICANT WHO IS QUALIFIED

   FOR SURE     ACCEPT  ADV     APPLICANT WHO IS QUALIFIED

     1-P        ACCEPT  ADV     APPLICANT WHO IS UNQUALIFIED

KEY: NO PREFERENCE=0  FOR SURE=1  CHANCE=2  RESTART=3

WHICH OPTION WOULD YOU PREFER IF P WERE 0.50?2
WHICH OPTION WOULD YOU PREFER IF P WERE 0.25?1
WHICH OPTION WOULD YOU PREFER IF P WERE 0.35?1
WHICH OPTION WOULD YOU PREFER IF P WERE 0.40?0
```

```
CONSIDER CAREFULLY THE FOLLOWING CHOICE BETWEEN A FOR SURE AND
A CHANCE OPTION

      P         ACCEPT  DISADV  APPLICANT WHO IS QUALIFIED

   FOR SURE     ACCEPT  DISADV  APPLICANT WHO IS UNQUALIFIED

     1-P        ACCEPT  ADV     APPLICANT WHO IS UNQUALIFIED

KEY: NO PREFERENCE=0  FOR SURE=1  CHANCE=2  RESTART=3

WHICH OPTION WOULD YOU PREFER IF P WERE 0.20?0
```

```
HERE ARE THE INDIFFERENCE PROBABILITIES YOU SPECIFIIED FOR
ACCEPTING AN APPLICANT.

     P          1-P                  FOR SURE                    P

1 0.40  UNQUALIFIED FROM ADV    QUALIFIED   FROM ADV    QUALIFIED FROM DISADV
2 0.20  UNQUALIFIED FROM ADV    UNQUALIFIED FROM DISADV QUALIFIED FROM DISADV

THE INDIFFERENCE PROBABILITIES FOR CHOICE SITUATIONS 1 AND 2
IMPLY THE FOLLOWING INDIFFERENCE PROBABILITIES.

3 0.25  UNQUALIFIED FROM DISADV QUALIFIED   FROM ADV    QUALIFIED FROM DISADV
4 0.50  UNQUALIFIED FROM ADV    UNQUALIFIED FROM DISADV QUALIFIED FROM ADV

ARE THESE INDIFFERENCE PROBABILITIES ACCEPTABLE (NO=0 YES=1)?1
```

```
HERE ARE THE UTILITY FUNCTIONS FOR THE TWO GROUPS WITH
THE MOST PREFERRED DECISION IN BOTH OF THE GROUPS HAS
BEEN ASSIGNED UTILITY 1 AND THE LEAST PREFERED 0.
GROUP ADV
                ---------------------------
                I           I             I
     SUCCEED    I   0.08    I    0.40     I
                I-----------I-------------I
                I           I             I
        FAIL    I   0.32    I    0.00     I
                ---------------------------
                    REJECT       ACCEPT
GROUP DISADV
                ---------------------------
                I           I             I
     SUCCEED    I   0.44    I    1.00     I
                I-----------I-------------I
                I           I             I
        FAIL    I   0.68    I    0.20     I
                ---------------------------
                    REJECT       ACCEPT

ARE THESE UTILITIES ACCEPTABLE (NO=0 YES=1)?1




TYPE THE NUMBER OF OPTIONS YOU WANT

    1.  DETERMINE CUT SCORES  (SINGLE PREDICTOR).
    2.  SELECT APPLICANTS FROM AN AVAILABLE DATA SET.
    3.  EXIT THE MODEL
?1
```

RESTRICTED SELECTION (DETERMINE THE CUT SCORES)

THIS MODULE WILL FIND THE CUT-OFF SCORES FOR BOTH GROUPS SUCH THAT THE SELECTION PROCEDURE MAXIMIZES THE EXPECTED UTILITY OF SELECTION PROCESS UNDER THE CONSTRAINT THAT ONLY A SPECIFIED PERCENTAGE OF THE TOTAL APPLICANTS POOL CAN BE ACCEPTED. THE CUT-OFF SCORES ARE ESTABLISHED NOW TO BE USED WITH THE DATA TO BE GATHERED LATER.

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

TO CARRY OUT THE ANALYSIS, YOU MUST PROVIDE (ESITMATE OF) THE PARAMETERS OF THE REGRESSION EQUATION. IN MANY CASES THIS MAY COMES DIRECTLY FROM A SAMPLE OR THEY MAY BE OBTAINED FROM A FITTED PRIOR DISTRIBUTION.

THE REGRESSION (PREDICTION) EQUATIONS CAN BE OBTAINED FROM SIMPLE OR MULTIPLE BAYESIAN REGRESSION ANALYSIS IN COMPONENT 24 OR 25.

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

```
HERE ARE THE OPTIONS TO ENTER THE REGRESSION EQUATION FOR
GROUP ADV

  1.  USE THE REGRESSION EQUATION FROM PERSONAL FILE.
  2.  ENTER THE REGRESSION EQUATION FROM TERMINAL.
  3.  ENTER THE SUFFICIENT STATISTICS FROM TERMINAL.
  4.  USE A SAMPLE DATA TO SEE THE ANALYSIS.
  5.  GO THROUGH BAYESIAN REGRESSION COMPONENTS AND
      COMPUTE THE PARAMETERS OF PREDICTION EQUATIONS.
  6.  EXIT THE MODULE.
?4
```

```
HERE ARE THE SAMPLE DATA FOR GROUP ADV

1. SAMPLE SIZE                N        105
2. MEAN OF PREDICTOR          X.        19.13
3. ST. DEV. OF PREDICTOR      S.D.X      5.130
4. MEAN OF CRITERION          Y.         2.28
5. ST. DEV. OF CRITERION      S.D.Y      0.896
6. CORRELATION COEFFICIENT R             0.490
7. INTERCEPT                  ALPHA      0.6428
8. SLOPE                      BETA       0.0856
9. RESIDUAL VARIANCE                     0.6219

IF THESE ARE THE DATA YOU WANT  TYPE '1', ELSE '0'?1
```

```
HERE ARE THE OPTIONS TO ENTER THE REGRESSION EQUATION FOR
GROUP DISADV

   1.  USE THE REGRESSION EQUATION FROM PERSONAL FILE.
   2.  ENTER THE REGRESSION EQUATION FROM TERMINAL.
   3.  ENTER THE SUFFICIENT STATISTICS FROM TERMINAL.
   4.  USE A SAMPLE DATA TO SEE THE ANALYSIS.
   5.  GO THROUGH BAYESIAN REGRESSION COMPONENTS AND
       COMPUTE THE PARAMETERS OF PREDICTION EQUATIONS.
   6.  EXIT THE MODULE.
?4
```

```
HERE ARE THE SAMPLE DATA FOR GROUP DISADV

1. SAMPLE SIZE              N        113
2. MEAN OF PREDICTOR        X.        17.17
3. ST. DEV. OF PREDICTOR    S.D.X      4.720
4. MEAN OF CRITERION        Y.         2.05
5. ST. DEV. OF CRITERION    S.D.Y      0.840
6. CORRELATION COEFFICIENT  R          0.460
7. INTERCEPT                ALPHA      0.6444
8. SLOPE                    BETA       0.0819
9. RESIDUAL VARIANCE                   0.5663

IF THESE ARE THE DATA YOU WANT  TYPE '1', ELSE '0'?1
```

```
IN ORDER TO ESTABLISH CUT SCORES FOR FUTURE USE WE NEED
ESTIMATES OF THE DISTRIBUTIONS OF PREDICTOR SCORES IN
ADV    AND DISADV POPULATIONS.  SPECIFICALLY, THIS MODEL
ASSUMES THAT BOTH DISTRIBUTIONS ARE NORMAL AND REQUIRES
THAT YOU ESTIMATE MEAN AND STANDARD DEVIATION FOR EACH
GROUP IN THE POPULATIONS FOR WHICH THE CUT SCORES WILL
BE USED.

FOR GROUP ADV

ENTER ESTIMATE OF MEAN ?22
ENTER ESTIMATE OF S.D. ?3

FOR GROUP DISADV

ENTER ESTIMATE OF MEAN ?18
ENTER ESTIMATE OF S.D. ?4




HOW MANY PERCENTAGE OF THE TOTAL APPLICANT POOL IS FROM ADV    ?80

ENTER THE MINIMUM SUCCESSFUL SCORE ?2
```

HERE ARE THE CUTTING SCORES FOR EACH GROUP THAT RESULT
IN THE OPTIMAL SELECTION FOR THE PERCENTAGE SHOWN.

PERCENT SELECTED	ADV CUT SCORE	DISADV CUT SCORE
94.8	14.830	15.025
84.9	17.965	16.942
72.6	19.675	17.943
64.2	20.530	18.423
54.7	21.385	18.885
44.8	22.240	19.328
32.2	23.380	19.884
23.9	24.235	20.273
13.6	25.660	20.863
4.6	28.510	21.819

WHAT PERCENTAGE DO YOU WANT TO SELECT (NONE=0) ?60

GROUP ADV CUT SCORE= 20.92, SELECT 64.1%
GROUP DISADV CUT SCORE= 18.63, SELECT 43.7%

WHAT PERCENTAGE DO YOU WANT TO SELECT (NONE=0) ?0

TYPE THE NUMBER OF OPTIONS YOU WANT

1. CHANGE THE DISTRIBUTIONS OF PREDICTORS
2. EXIT THE MODULE

?2

MODEL 2.   RESTRICTED SELECTION

1. ASSESSMENT OF UTILITY STRUCTURES
2. DETERMINATION OF CUT SCORES (SINGLE PREDICTOR)
3. SELECTION OF APPLICANTS FROM AN AVAILABLE DATA SET

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0

COMPONENT 32. EDUCATIONAL AND EMPLOYMENT SELECTION

1. QUOTA-FREE SELECTION (ONE GROUP)
2. RESTRICTED SELECTION (TWO GROUPS)

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?0

COMPONENT GROUP 3. DECISION THEORETIC MODELS

31. UTILITIES AND EXPECTED UTILITIES
32. EDUCATIONAL AND EMPLOYMENT SELECTION
33. SELECTION OF EDUCATIONAL TREATMENT

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?0

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?1

```
COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12.  DATA MOVEMENT      ( INPUT/OUTPUT, EDITING )
13.  DATA TRANSFORMATIONS
14.  FILE MAINTENANCE  ( DATA GROUPING )

    * NOT YET AVAILABLE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?12
```

```
     COMPONENT 12.  DATA MOVEMENT

     1.  DATA ENTRY AND TRANSFERS
     2.  DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' )?1
```

```
MODEL 1.  DATA ENTRY AND TRANSFERS

1.   DATA ENTRY FROM THE TERMINAL
2.   DATA TRANSFER FROM DISK
3.   DATA TRANSFER FROM THE CATALOG

4.   DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER ( ELSE '0' )?3
```

```
THE DATA FILE CATALOG

1. ITBS SCORES, SCHOOL #1
2. ITBS SCORES, SCHOOL #14
3. ESAA PILOT PROGRAM
4. IOWA COUNTY DATA
5. SAMPLE REGRESSION DATA
6. SAMPLE ANOVA DATA
7. SAMPLE MANOVA DATA
8. JUNIOR COLLEGE ACT SCORES

IF YOU WANT AN AVAILABLE DATA SET, TYPE ITS NUMBER ( ELSE '0' ).?5

TO TRANSFER THESE DATA TO YOUR WORK FILE, TYPE '1',
TO OBTAIN A DESCRIPTION OF THESE DATA,     TYPE '2'.?1
```

```
THE DATA SET IS NOW IN THE PERSONAL FILE.  IT WILL REMAIN THERE
UNTIL YOU SIGN OFF THE MONITOR OR REPLACE IT WITH ANOTHER DATA
SET.

IF YOU WISH TO PROCEED TO AN ANALYSIS,     TYPE '1'.
IF YOU WISH TO REMAIN IN DATA MANAGEMENT, TYPE '2'.?1
```

```
     COMPONENT GROUPS

1.   DATA MANAGEMENT FACILITY
2.   SIMPLE BAYESIAN PARAMETRIC MODELS
3.   DECISION THEORETIC MODELS
4.   BAYESIAN SIMULTANEOUS ESTIMATION
5.   BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.   BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.   ELEMENTARY CLASSICAL STATISTICS
8.   EXPLORATORY DATA ANALYSIS
9.   PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?3
```

COMPONENT GROUP 3. DECISION THEORETIC MODELS

31. UTILITIES AND EXPECTED UTILITIES
32. EDUCATIONAL AND EMPLOYMENT SELECTION
33. SELECTION OF EDUCATIONAL TREATMENT

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?32

COMPONENT 32. EDUCATIONAL AND EMPLOYMENT SELECTION

1. QUOTA-FREE SELECTION (ONE GROUP)
2. RESTRICTED SELECTION (TWO GROUPS)

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?2

MODEL 2.   RESTRICTED SELECTION

1. ASSESSMENT OF UTILITY STRUCTURES
2. DETERMINATION OF CUT SCORES (SINGLE PREDICTOR)
3. SELECTION OF APPLICANTS FROM AN AVAILABLE DATA SET

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?3

RESTRICTED SELECTION (SELECT APPLICANTS)

THIS MODULE WILL SELECT THE APPLICANTS FROM AN AVAILABLE DATA SET. THE SELECTION PROCEDURE MAXIMIZES THE EXPECTED UTILITY OF SELECTION PROCESS UNDER THE CONSTRAINT THAT ONLY A SPECIFIED NUMBER OF THE TOTAL APPLICANTS CAN BE APPLICANT CAN BE ACCEPTED. THE APPLICANTS ARE ASSUMED FROM TWO DIFFERENTS POPULATIONS, THE APPLICANTS IN THE SAMPLE WITH THE HIGHEST EXPECTED UTILITY WILL BE SELECTED.

WHEN YOU ARE READY TO CONTINUE   TYPE '1'?1

```
YOUR PERSONAL FILE DOES NOT CONTAIN YOUR THRESHOLD UTILITY
FUNCTION.  YOU MAY EITHER ENTER YOUR UTILITY FUNCTION FROM
THE TERMINAL OR GO THROUGH THE THRESHOLD UTILITY ASSESSMENT
PROCEDURE.

IF YOU WANT TO ENTER YOUR UTILITY FUNCTION,         TYPE '1'.
IF YOU WANT TO GO THROUGH THE ASSESSMENT PROCEDURE, TYPE '2'.
?1
```

```
PLEASE PROVIDE A NAME FOR EACH OF THE GROUPS INVOLVED IN YOUR
SELECTION PROBLEM.  EACH NAME MAY BE UP TO 6 CHARACTERS LONG.

WHAT NAME DO YOU WANT TO USE FOR THE FIRST GROUP ?ADV

WHAT NAME DO YOU WANT TO USE FOR THE SECOND GROUP ?DISADV

YOU ENTERED ADV     AND  DISADV.

DID YOU ENTER THE NAMES CORRECTLY (NO=0 YES=1)?1
```

THE UTILITY FUNCTIONS FOR THE TWO GROUPS ARE REPRESENTED BELOW:

GROUP ADV

OUTCOME	DECISION: REJECT	DECISION: ACCEPT
SUCCESSFUL	B1	A1
UNSUCCESSFUL	C1	D1

GROUP DISAD

OUTCOME	DECISION: REJECT	DECISION: ACCEPT
SUCCESSFUL	B2	A2
UNSUCCESSFUL	C2	D2

WHICH CORRECT DECISION HAS THE HIGHEST UTILITY
(A1=1,C1=2, A2=3,C2=4)?3

WHICH INCORRECT DECISION HAS THE LOWEST UTILITY
(B1=1,D1=2, B2=3,D2=4)?2

REMEMBER THAT

THE CORRECT DECISIONS ARE
A - ACCEPT APPLICANT WHO IS SUCCESSFUL
C - REJECT APPLICANT WHO WOULD HAVE BEEN UNSUCCESSFUL

THE INCORRECT DECISIONS ARE
B - REJECT APPLICANT WHO WOULD HAVE BEEN SUCCESSFUL
D - ACCEPT APPLICANT WHO IS UNSUCCESSFUL

ADV = 1 DISADV = 2

LET THE FOLLOWING UTILITIES BE ASSIGNED

A2= 1.00
D1= 0.00

WHAT IS THE UTILITY OF DECISION A1?.4
WHAT IS THE UTILITY OF DECISION B1?.08
WHAT IS THE UTILITY OF DECISION C1?.32
WHAT IS THE UTILITY OF DECISION B2?.44
WHAT IS THE UTILITY OF DECISION C2?.68
WHAT IS THE UTILITY OF DECISION D2?.20

GROUP ADV

OUTCOME	DECISION: REJECT	DECISION: ACCEPT
SUCCESSFUL	0.08	0.40
UNSUCCESSFUL	0.32	0.00

GROUP DISAD

OUTCOME	DECISION: REJECT	DECISION: ACCEPT
SUCCESSFUL	0.44	1.00
UNSUCCESSFUL	0.68	0.20

ARE THE UTILITIES ENTERED CORRECTLY (NO=0 YES=1)?1

TO CARRY OUT THE ANALYSIS, YOU MUST PROVIDE (ESITMATE OF) THE PARAMETERS OF THE REGRESSION EQUATION. IN MANY CASES THIS MAY COMES DIRECTLY FROM A SAMPLE OR THEY MAY BE OBTAINED FROM A FITTED PRIOR DISTRIBUTION.

THE REGRESSION (PREDICTION) EQUATIONS CAN BE OBTAINED FROM SIMPLE OR MULTIPLE BAYESIAN REGRESSION ANALYSIS IN COMPONENT 24 OR 25.

WHEN YOU ARE READY TO CONTINUE   TYPE '1'?1

ARE THE PARAMETERS OF THE PREDICTION EQUATIONS ARE IN YOUR PERSONAL FILE. (NO=0, YES=1)?0

THERE ARE NO PARAMETERS OF REGRESSION EQUATIONS STORED IN YOUR WORK FILE.

THEREFORE, THE SELECTION WILL BASED UPON YOUR SAMPLE DATA.

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

```
DATA SET  COLDAT

VARIABLES 1     ENGLSH
          2      MATH
          3     NATSCI
          4      GPA

TYPE THE VARIABLE NUMBER OF THE CRITERION VARIABLE (NONE=0).
?4
```

```
GROUPS 1    COLL6      NO. OF OBS. = 25
       2    COLL7      NO. OF OBS. = 25
       3    COLL8      NO. OF OBS. = 25
       4    COLL9      NO. OF OBS. = 25
       5    COLL10     NO. OF OBS. = 25
       6    COLL11     NO. OF OBS. = 25
       7    COLL12     NO. OF OBS. = 25
       8    COLL13     NO. OF OBS. = 25
       9    COLL15     NO. OF OBS. = 25
       10   COLL19     NO. OF OBS. = 25

TOTAL NUMBER OF OBSERVATIONS = 250

WHICH GROUP DO YOU WANT FOR  ADV   ?1
```

```
GROUPS 1    COLL6     NO. OF OBS. = 25
       2    COLL7     NO. OF OBS. = 25
       3    COLL8     NO. OF OBS. = 25
       4    COLL9     NO. OF OBS. = 25
       5    COLL10    NO. OF OBS. = 25
       6    COLL11    NO. OF OBS. = 25
       7    COLL12    NO. OF OBS. = 25
       8    COLL13    NO. OF OBS. = 25
       9    COLL15    NO. OF OBS. = 25
       10   COLL19    NO. OF OBS. = 25

TOTAL NUMBER OF OBSERVATIONS = 250

WHICH GROUP DO YOU WANT FOR  DISADV?2
```

```
WHAT IS THE MINIMUM OUTCOME SCORE THAT IS INDICATIVE OF
SUCCESS?2
```

NUMBER OF APPLICANTS FROM ADV   = 25
NUMBER OF APPLICANTS FROM DISADV = 25

HOW MANY APPLICANTS DO YOU WANT TO SELECT (NONE=0)?30

HERE IS THE ORDER IN WHICH THE APPLICANTS SHOULD BE SELECTED. THE APPLICANT NUMBER REFERS TO WHERE THE APPLICANT'S SCORES ARE STORED ON THE FILE.

GROUP 1 = COLL6   GROUP 2 = COLL7

	GRP	APP'T	ENGLSH	MATH	NATSCI	GPA
1.	2	10	28.000	24.000	24.000	2.800
2.	2	4	21.000	29.000	26.000	3.600
3.	2	7	25.000	24.000	25.000	3.200
4.	2	8	23.000	25.000	24.000	3.200
5.	2	20	29.000	16.000	26.000	1.800
6.	2	5	26.000	22.000	20.000	1.100
7.	2	24	18.000	26.000	24.000	2.400
8.	2	16	19.000	26.000	22.000	2.500
9.	1	1	22.000	19.000	31.000	2.400
10.	2	17	19.000	26.000	21.000	0.500

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

HERE IS THE ORDER IN WHICH THE APPLICANTS SHOULD BE SELECTED. THE APPLICANT NUMBER REFERS TO WHERE THE APPLICANT'S SCORES ARE STORED ON THE FILE.

GROUP 1 = COLL6   GROUP 2 = COLL7

	GRP	APP'T	ENGLSH	MATH	NATSCI	GPA
11.	2	11	20.000	22.000	25.000	1.100
12.	2	13	22.000	20.000	25.000	1.800
13.	2	22	15.000	26.000	23.000	3.600
14.	2	9	23.000	16.000	23.000	2.900
15.	2	1	20.000	22.000	17.000	2.300
16.	2	3	23.000	15.000	22.000	3.500
17.	1	22	23.000	23.000	23.000	2.600
18.	1	13	25.000	19.000	24.000	1.100
19.	1	7	9.000	20.000	25.000	1.900
20.	1	19	19.000	27.000	20.000	2.700

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

HERE IS THE ORDER IN WHICH THE APPLICANTS SHOULD BE SELECTED. THE APPLICANT NUMBER REFERS TO WHERE THE APPLICANT'S SCORES ARE STORED ON THE FILE.

GROUP 1 = COLL6   GROUP 2 = COLL7

	GRP	APP'T	ENGLSH	MATH	NATSCI	GPA
21.	2	14	21.000	15.000	20.000	1.300
22.	2	12	19.000	18.000	18.000	2.700
23.	2	25	13.000	18.000	26.000	1.700
24.	1	8	21.000	12.000	25.000	2.800
25.	2	18	17.000	23.000	12.000	2.000
26.	1	3	19.000	18.000	22.000	3.000
27.	2	6	16.000	18.000	19.000	2.600
28.	2	15	20.000	16.000	14.000	2.000
29.	1	18	13.000	16.000	22.000	1.600
30.	1	25	21.000	10.000	24.000	2.600

APPLICANTS SELECTED: GROUP 1 = 9   GROUP 2 = 21

DO YOU WANT TO CHANGE THE QUOTA CONSTRAINTS (NO=0 YES=1)?0

THIS COMPLETE THE ANALYSIS, TO CONTINUE TYPE '1'?1

MODEL 2. RESTRICTED SELECTION

1. ASSESSMENT OF UTILITY STRUCTURES
2. DETERMINATION OF CUT SCORES (SINGLE PREDICTOR)
3. SELECTION OF APPLICANTS FROM AN AVAILABLE DATA SET

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0

COMPONENT 32. EDUCATIONAL AND EMPLOYMENT SELECTION

1. QUOTA-FREE SELECTION (ONE GROUP)
2. RESTRICTED SELECTION (TWO GROUPS)

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?0

COMPONENT GROUP 3. DECISION THEORETIC MODELS

31. UTILITIES AND EXPECTED UTILITIES
32. EDUCATIONAL AND EMPLOYMENT SELECTION
33. SELECTION OF EDUCATIONAL TREATMENT

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?33

COMPONENT 33. ASSIGNMENT TO TREATMENT

1. ASSIGNMENT WITH THRESHOLD UTILITIES
2. ASSIGNMENT WITH CONDITIONAL UTILITIES

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?1

ASSIGNMENT WITH THRESHOLD UTILITIES

1. ASSESSMENT OF THRESHOLD UTILITIES
2. DETERMINE THE CUT SCORES FOR THE TREATMENTS
3. ASSIGN APPLICANTS FROM AN AVAILABLE DATA SET

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0').?1

ASSESSMENT OF UTILITY STRUCTURE

THIS MODEL ASSUMES THAT EACH PERSON ASSIGNED TO A TREATMENT WILL UPON COMPLETION OF THE TREATMENT BE JUDGED TO HAVE SUCCEEDED OR FAILED ON THE BASIS OF HIS PERFORMANCE ON AN OUTCOME MEASURE.

IT IS ASSUMED THAT THE SAME PREDICTORS ARE USED TO PREDICT THE OUTCOME IN EACH OF THE TREATMENTS. HOWEVER, THE OUTCOME MEASURES FOR THE TREATMENTS MAY DIFFER. FOR EXAMPLE, IF THE TREATMENTS ARE METHODS OF INSTRUCTING THE SAME SUBJECT MATTER THE OUTCOMES MEASURES ARE LIKELY TO BE THE SAME; HOWEVER, IF THE TREATMENTS ARE DIFFERENT TRADE SCHOOLS THEN THE MEASURES ARE PROBABLY DIFFERENT.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

```
HOW MANY DIFFERENT TREATMENTS ARE THERE (2 OR 3) ?3

PLEASE SPECIFY A NAME FOR EACH TREATMENT (MAX LENGTH=6).

NAME FOR TREATMENT 1 ?TRT1
NAME FOR TREATMENT 2 ?TRT2
NAME FOR TREATMENT 3 ?TRT3
```

```
PLEASE CONSIDER THE FOLLOWING ASSIGNMENT OPTIONS.

          ASSIGN TO         PROBABLITY PERSON WILL
          TREATMENT         SUCCEED IN TREATMENT

            TRT1                 0.50

            TRT2                   P

IF THERE IS SOME PROBABILITY P SUCH THAT FOR THIS P YOU
WOULD HAVE NO PREFERENCE BETWEEN THE TWO ASSIGNMENTS
                                     ENTER THIS P, ELSE '0'.?.6
```

PLEASE CONSIDER THE FOLLOWING ASSIGNMENT OPTIONS.

ASSIGN TO TREATMENT	PROBABLITY PERSON WILL SUCCEED IN TREATMENT
TRT1	0.25
TRT2	P

IF THERE IS SOME PROBABILITY P SUCH THAT FOR THIS P YOU WOULD HAVE NO PREFERENCE BETWEEN THE TWO ASSIGNMENTS ENTER THIS P, ELSE '0'.?.2

YOUR RESPONSES INDICATE THAT FOR EACH OF THE FOLLOWING PAIRS OF PROBABILITIES OF SUCCESS YOU WOULD HAVE NO PREFERENCE BETWEEN THESE TWO TREATMENTS.

--- PROBABILITY OF SUCCESS ---	
TRT1	TRT2
.20	.12
.30	.28
.40	.44
.50	.60
.60	.76
.70	.92

ARE YOU INDIFFERENT FOR EACH PAIR (NO=0 YES=1)?1

HERE IS A UTILITY STRUCTURE CONSISTENT WITH YOUR RESPONSES.

	TRT1	TRT2
SUCCESS	1.00	0.75
FAILURE	0.00	0.13

TYPE THE NUMBER OF OPTION YOU WANT

1. ACCEPT THE THRESHOLD UTILITY AN CONTINUE THE ASSESSMENT
2. MODIFY THE INDIFFERENCE PROBABILITIES
3. RESTART THE ASSESSMENT PROCEDURE

?1

PLEASE CONSIDER THE FOLLOWING ASSIGNMENT OPTIONS.

ASSIGN TO TREATMENT	PROBABLITY PERSON WILL SUCCEED IN TREATMENT
TRT1	0.50
TRT3	P

IF THERE IS SOME PROBABILITY P SUCH THAT FOR THIS P YOU
WOULD HAVE NO PREFERENCE BETWEEN THE TWO ASSIGNMENTS
ENTER THIS P, ELSE '0'.?.8

PLEASE CONSIDER THE FOLLOWING ASSIGNMENT OPTIONS.

ASSIGN TO TREATMENT	PROBABLITY PERSON WILL SUCCEED IN TREATMENT
TRT1	0.25
TRT3	P

IF THERE IS SOME PROBABILITY P SUCH THAT FOR THIS P YOU WOULD HAVE NO PREFERENCE BETWEEN THE TWO ASSIGNMENTS
ENTER THIS P, ELSE '0'.?.1

YOUR RESPONSES INDICATE THAT FOR EACH OF THE FOLLOWING PAIRS OF PROBABILITIES OF SUCCESS YOU WOULD HAVE NO PREFERENCE BETWEEN THESE TWO TREATMENTS.

--- PROBABILITY OF SUCCESS ---	
TRT1	TRT3
.30	.24
.40	.52
.50	.80

ARE YOU INDIFFERENT FOR EACH PAIR (NO=0 YES=1)?1

HERE IS A UTILITY STRUCTURE CONSISTENT WITH YOUR RESPONSES.

	TRT1	TRT3
SUCCESS	1.00	0.57
FAILURE	0.00	0.21

TYPE THE NUMBER OF OPTION YOU WANT

1. ACCEPT THE THRESHOLD UTILITY AN CONTINUE THE ASSESSMENT
2. MODIFY THE INDIFFERENCE PROBABILITIES
3. RESTART THE ASSESSMENT PROCEDURE

?1

YOUR RESPONSES IMPLY THAT FOR EACH OF THE FOLLOWING TRIPLES OF PROBABILITY OF SUCCESS YOU WOULD HAVE NO PREFERENCE AMONG THESE THREE TREATMENTS.

TRT1	TRT2	TRT3
0.30	0.28	0.24
0.40	0.44	0.52
0.50	0.60	0.80

ARE YOU INDIFFERENT FOR EACH TRIPLE (NO=0 YES=1) ?1

HERE IS A UTILITY STRUCTURE THAT IS CONSISTENT WITH YOUR RESPONSES.

	TRT1	TRT2	TRT3
SUCCESS	1.00	0.75	0.57
FAILURE	0.00	0.13	0.21

TYPE THE NUMBER OF OPTION YOU WANT

1. ACCEPT THE THRESHOLD UTILITY.
2. MODIFY THE INDIFFERENCE PROBABILITIES
3. RESTART THE ASSESSMENT PROCEDURE

?1

TYPE THE NUMBER OF OPTIONS YOU WANT

1. DETERMINE THE CUT SCORES FOR THE TREATMENTS
2. ASSIGN APPLICANTS FROM AN AVAILABLE DATA SET
3. TO EXIT THE MODULE

?1

TREATMENT ASSIGNMENT (DETERMINE CUT SCORES)

THIS MODULE FINDS THE CUT SCORES FOR TWO OR THREE TREATMENT ASSIGNMENT. IT IS ASSUMED THAT THERE ARE NO CONSTRAINTS ON THE NUMBER OF PERSONS THAT CAN BE ASSIGNED TO EACH TREATMENT THE OPTIMAL ASSIGNMENT IS TO ASSIGN EACH PERSON TO THE TREATMENT WITH THE HIGHEST EXPECTED UTILITY.

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

DETERMINE THE CUT SCORES (SINGLE PREDICTOR)

TO CARRY OUT THE ANALYSIS, YOU MUST PROVIDE (ESTIMATE OF) THE PARAMETERS OF THE REGRESSION EQUATIONS. IN MANY CASES THIS MAY COMES DIRECTLY FROM A SAMPLE OR THEY MAY BE OBTAINED FROM A FITTED PRIOR DISTRIBUTION.

THE REGRESSION(PREDICTION) EQUATIONS CAN BE OBTAINED FROM BAYESIAN REGRESSION MODEL IN COMPONENT 24 OR 25.

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

```
HERE ARE THE OPTIONS TO ENTER THE REGRESSION EQUATION, IT IS
ASSUMED THE SAME REGRESSION EQUATION IS USED FOR DIFFERENT
TREATMENTS.

   1.  USE THE REGRESSION EQUATION FROM PERSONAL FILE.
   2.  ENTER THE REGRESSION EQUATION FROM TERMINAL.
   3.  ENTER THE SUFFICIENT STATISTICS FROM TERMINAL.
   4.  USE A SAMPLE DATA TO SEE THE ANALYSIS.
   5.  GO THROUGH BAYESIAN REGRESSION COMPONENTS AND
       COMPUTE THE PARAMETERS OF PREDICTION EQUATIONS.
   6.  EXIT THE MODULE.
?4
```

```
HERE ARE THE SAMPLE DATA.

1. SAMPLE SIZE               N          105
2. MEAN OF PREDICTOR         X.          19.1300
3. ST. DEV. OF PREDICTOR     S.D.X        5.1327
4. MEAN OF CRITERION         Y.           2.2800
5. ST. DEV. OF CRITERION     S.D.Y        0.8962
6. CORRELATION COEFFICIENT   R            0.4875
7. INTERCEPT                 ALPHA        0.6515
8. SLOPE                     BETA         0.0851
9. RESIDUAL VARIANCE                      0.6242

IF THESE ARE THE DATA YOU WANT          TYPE '1'
          ELSE                          TYPE '0'?1
```

```
FOR EACH OF THE TREATMENTS PLEASE SPECIFY WHAT YOU CONSIDER
TO BE THE MINIMUM ACCEPTABLE OUTCOME SCORE.  SCORES LESS
THAN THIS ARE CONSIDERED INDICATIVE OF FAILURE.

WHAT IS THE MINIMUM ACCEPTABLE SCORE FOR TRT1    ?2.4
WHAT IS THE MINIMUM ACCEPTABLE SCORE FOR TRT2    ?2.2
WHAT IS THE MINIMUM ACCEPTABLE SCORE FOR TRT3    ?2.0

WHAT IS THE SMALLEST POSSIBLE PREDICTOR SCORE ?0
WHAT IS THE LARGEST POSSIBLE PREDICTOR SCORE ?36
```

	TRT1	TRT2	TRT3
SUCCESS	1.00	0.75	0.57
FAILURE	0.00	0.13	0.21

```
THE MINIMUM ACCEPTABLE SCORE FOR TRT1   =    2.40
THE MINIMUM ACCEPTABLE SCORE FOR TRT2   =    2.20
THE MINIMUM ACCEPTABLE SCORE FOR TRT3   =    2.00

THE OPTIMAL ASSIGNMENT IS

            PREDICTOR SCORE  >=   20.2    ASSIGN TO   TRT1
   20.2  >= PREDICTOR SCORE  >=   17.4    ASSIGN TO   TRT2
            PREDICTOR SCORE  <=   17.4    ASSIGN TO   TRT3

TYPE NUMBER OF OPTIONS YOU WANT
  1.  CHANGE THE MINIMUM ACCEPTABLE SCORES
```

```
  2.  CHANGE THE REGRESSION EQUATION.
  3.  EXIT THE MODULE.
?3
```

```
        ASSIGNMENT WITH THRESHOLD UTILITIES

     1. ASSESSMENT OF THRESHOLD UTILITIES
     2. DETERMINE THE CUT SCORES FOR THE TREATMENTS
     3. ASSIGN APPLICANTS FROM AN AVAILABLE DATA SET

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER ( ELSE '0' ).?3
```

TREATMENT ASSIGNMENT (ASSIGN APPLICANTS)

THIS MODULE WILL ASSIGN APPLICANTS TO TWO OR THREE TREATMENTS FROM A DATA SET OF PERSON SCORES. THE EXPECTED UTILITY OF ANY ASSIGNMENT IS ASSUMED TO BE EQUAL TO THE SUM OF THE EXPECTED UTILITY OF THE INDIVIDUAL ASSIGNMENT. THE OPTIMAL ASSIGNMENT IS ASSUMED TO BE THE ONE THAT MAXIMIZES THE SUM OF THE INDIVIDUAL EXPECTED UTILITIES.

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

HERE ARE THE UTILITIES IN YOUR PERSONAL FILE.

	TRT1	TRT2	TRT3
SUCCESS	1.00	0.75	0.57
FAILURE	0.00	0.13	0.21

IF YOU WANT TO USE THESE UTILITIES TYPE '1'
TO REENTER THE UTILITIES TYPE '2'
?1

FOR EACH OF THE TREATMENTS PLEASE SPECIFY WHAT YOU CONSIDER TO BE THE MINIMUM ACCEPTABLE OUTCOME SCORE. SCORES LESS THAN THIS ARE CONSIDERED INDICATIVE OF FAILURE.

WHAT IS THE MINIMUM ACCEPTABLE SCORE FOR TRT1 ?2.4
WHAT IS THE MINIMUM ACCEPTABLE SCORE FOR TRT2 ?2.2
WHAT IS THE MINIMUM ACCEPTABLE SCORE FOR TRT3 ?2.0

TO CARRY OUT THE ANALYSIS, YOU MUST PROVIDE (ESTIMATE OF) THE PARAMETERS OF THE REGRESSION EQUAITONS. IN MANY CASES THIS MAY COMES DIRECTLY FROM A SAMPLE OR THEY MAY BE OBTAINED FROM A FITTED PRIOR DISTRIBUTION.

THE REGRESSION(PREDICTION) EQUATIONS CAN BE OBTAINED FROM BAYESIAN REGRESSION MODEL IN COMPONENT 24 OR 25.

ARE THE PARAMETERS OF THE PREDICTION EQUATIONS ARE IN YOUR PERSONAL FILE. (NO=0, YES=1)?0

```
THERE ARE NO PARAMETERS OF REGRESSION EQUATIONS STORED IN
YOUR WORK FILE.

THEREFOR, THE SELECTION WILL BASED UPON YOUR SAMPLE DATA.

WHEN YOU ARE READY TO CONTINUE                    TYPE '1'?1
```

```
DATA SET   COLDAT

VARIABLES 1     ENGLSH
          2      MATH
          3     NATSCI
          4      GPA

TYPE THE VARIABLE NUMBER OF THE CRITERION VARIABLE (NONE=0).
?4
```

```
GROUPS 1     COLL6        NO. OF OBS. = 25
       2     COLL7        NO. OF OBS. = 25
       3     COLL8        NO. OF OBS. = 25
       4     COLL9        NO. OF OBS. = 25
       5     COLL10       NO. OF OBS. = 25
       6     COLL11       NO. OF OBS. = 25
       7     COLL12       NO. OF OBS. = 25
       8     COLL13       NO. OF OBS. = 25
       9     COLL15       NO. OF OBS. = 25
       10    COLL19       NO. OF OBS. = 25

TOTAL NUMBER OF OBSERVATIONS = 250

WHICH GROUP DO YOU WANT FOR THE SELECTION ?1
```

```
        ASSIGN APPLICANTS (THREE TREATMENTS)

THE EXPECTED UTILITY OF ASSIGNMENT TO EACH OF THE TREATMENTS
IS NOW BEING CALCULATED FOR EACH PERSON.

WHEN YOU ARE READY TO CONTINUE                  TYPE '1'?1
```

```
ARE THERE ANY RESTRICTIONS ON THE NUMBER OF PERSONS THAT
CAN BE ASSIGNED TO ANY ONE TREATMENT.      (NO=0 YES=1)?1

PLEASE SPECIFY THE ASSIGNMENT RESTRICTIONS.

NUMBER OF PERSONS TO BE ASSIGNED  25

HOW MANY DO YOU WANT TO ASSIGN TO TRT1 ?10

HOW MANY DO YOU WANT TO ASSIGN TO TRT3  ?5
```

OPTIMAL ASSIGNMENT

					EXPECTED	UTILITY		ASSIGN
NO	ENGLSH	MATH	NATSCI	GPA	TRT1	TRT2	TRT3	TO
1	22.00	19.00	31.00	2.40	65	58	50	TRT1
2	12.00	18.00	12.00	0.40	15	26	32	TRT3
3	19.00	18.00	22.00	3.00	39	43	42	TRT1
4	6.00	15.00	10.00	1.50	10	22	29	TRT3
5	9.00	16.00	14.00	2.50	16	27	33	TRT3
6	17.00	11.00	20.00	3.00	25	34	37	TRT2
7	9.00	20.00	25.00	1.90	48	48	45	TRT1
8	21.00	12.00	25.00	2.80	40	44	43	TRT1
9	19.00	11.00	16.00	1.60	17	28	33	TRT2
10	17.00	19.00	15.00	1.10	22	31	35	TRT2

```
EXPECTED UTILITIES HAVE BEEN MULTIPLIED BY 100.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1
```

OPTIMAL ASSIGNMENT

					EXPECTED	UTILITY		ASSIGN
NO	ENGLSH	MATH	NATSCI	GPA	TRT1	TRT2	TRT3	TO
11	20.00	11.00	21.00	1.70	28	36	38	TRT2
12	19.00	21.00	14.00	3.30	22	31	35	TRT2
13	25.00	19.00	24.00	1.10	47	48	45	TRT1
14	9.00	14.00	17.00	1.80	21	30	35	TRT2
15	18.00	14.00	20.00	1.60	28	36	38	TRT2
16	16.00	15.00	17.00	2.10	22	31	35	TRT2
17	5.00	5.00	11.00	1.10	8	20	27	TRT3
18	13.00	16.00	22.00	1.60	35	41	41	TRT1
19	19.00	27.00	20.00	2.70	44	46	44	TRT1
20	21.00	3.00	20.00	1.30	21	30	34	TRT2

EXPECTED UTILITIES HAVE BEEN MULTIPLIED BY 100.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

OPTIMAL ASSIGNMENT

					EXPECTED	UTILITY		ASSIGN
NO	ENGLSH	MATH	NATSCI	GPA	TRT1	TRT2	TRT3	TO
21	13.00	16.00	6.00	0.50	7	20	27	TRT3
22	23.00	23.00	23.00	2.60	49	49	45	TRT1
23	14.00	20.00	13.00	1.70	18	28	34	TRT2
24	20.00	17.00	20.00	1.40	32	38	40	TRT1
25	21.00	10.00	24.00	2.60	35	41	41	TRT1

EXPECTED UTILITIES HAVE BEEN MULTIPLIED BY 100.

TOTAL ASSIGNMENT
TRT1 = 10 TRT2 = 10 TRT3 = 5

DO YOU WANT TO CHANGE THE QUOTA CONSTRAINTS (NO=0 YES=1)?1

ARE THERE ANY RESTRICTIONS ON THE NUMBER OF PERSONS THAT
CAN BE ASSIGNED TO ANY ONE TREATMENT.   (NO=0 YES=1)?0

OPTIMAL ASSIGNMENT

					EXPECTED	UTILITY		ASSIGN
NO	ENGLSH	MATH	NATSCI	GPA	TRT1	TRT2	TRT3	TO
1	22.00	19.00	31.00	2.40	65	58	50	TRT1
2	12.00	18.00	12.00	0.40	15	26	32	TRT3
3	19.00	18.00	22.00	3.00	39	43	42	TRT2
4	6.00	15.00	10.00	1.50	10	22	29	TRT3
5	9.00	16.00	14.00	2.50	16	27	33	TRT3
6	17.00	11.00	20.00	3.00	25	34	37	TRT3
7	9.00	20.00	25.00	1.90	48	48	45	TRT1
8	21.00	12.00	25.00	2.80	40	44	43	TRT2
9	19.00	11.00	16.00	1.60	17	28	33	TRT3
10	17.00	19.00	15.00	1.10	22	31	35	TRT3

EXPECTED UTILITIES HAVE BEEN MULTIPLIED BY 100.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

OPTIMAL ASSIGNMENT

					EXPECTED	UTILITY		ASSIGN
NO	ENGLSH	MATH	NATSCI	GPA	TRT1	TRT2	TRT3	TO
11	20.00	11.00	21.00	1.70	28	36	38	TRT3
12	19.00	21.00	14.00	3.30	22	31	35	TRT3
13	25.00	19.00	24.00	1.10	47	48	45	TRT2
14	9.00	14.00	17.00	1.80	21	30	35	TRT3
15	18.00	14.00	20.00	1.60	28	36	38	TRT3
16	16.00	15.00	17.00	2.10	22	31	35	TRT3
17	5.00	5.00	11.00	1.10	8	20	27	TRT3
18	13.00	16.00	22.00	1.60	35	41	41	TRT3
19	19.00	27.00	20.00	2.70	44	46	44	TRT2
20	21.00	3.00	20.00	1.30	21	30	34	TRT3

EXPECTED UTILITIES HAVE BEEN MULTIPLIED BY 100.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

OPTIMAL ASSIGNMENT

					EXPECTED	UTILITY		ASSIGN
NO	ENGLSH	MATH	NATSCI	GPA	TRT1	TRT2	TRT3	TO
21	13.00	16.00	6.00	0.50	7	20	27	TRT3
22	23.00	23.00	23.00	2.60	49	49	45	TRT2
23	14.00	20.00	13.00	1.70	18	28	34	TRT3
24	20.00	17.00	20.00	1.40	32	38	40	TRT3
25	21.00	10.00	24.00	2.60	35	41	41	TRT3

EXPECTED UTILITIES HAVE BEEN MULTIPLIED BY 100.

TOTAL ASSIGNMENT
TRT1 = 2 TRT2 = 5 TRT3 = 18

DO YOU WANT TO CHANGE THE QUOTA CONSTRAINTS (NO=0 YES=1)?0

THIS COMPLETES THE ANAYLSIS. TYPE '1' TO CONTINUE.?1

ASSIGNMENT WITH THRESHOLD UTILITIES

1. ASSESSMENT OF THRESHOLD UTILITIES
2. DETERMINE THE CUT SCORES FOR THE TREATMENTS
3. ASSIGN APPLICANTS FROM AN AVAILABLE DATA SET

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0').?0

COMPONENT 33. ASSIGNMENT TO TREATMENT

1. ASSIGNMENT WITH THRESHOLD UTILITIES
2. ASSIGNMENT WITH CONDITIONAL UTILITIES

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?0

COMPONENT GROUP 3. DECISION THEORETIC MODELS

31. UTILITIES AND EXPECTED UTILITIES
32. EDUCATIONAL AND EMPLOYMENT SELECTION
33. SELECTION OF EDUCATIONAL TREATMENT

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?0

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?2

```
COMPONENT GROUP 2.  SIMPLE BAYESIAN PARAMETRIC MODELS

21.  BINARY MODELS
22.  UNIVARIATE NORMAL MODELS
23.  MULTI-CATEGORY MODELS
24.  SIMPLE LINEAR REGRESSION ANALYSIS
25.  MULTIPLE LINEAR REGRESSION ANALYSIS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?25
```

```
  COMPONENT 25.  MULTIPLE LINEAR REGRESSION ANALYSIS

     1. NONINFORMATIVE PRIORS
     2. INFORMATIVE PRIORS

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' ).?1
```

BAYESIAN REGRESSION (NON-INFORMATIVE PRIOR)

1. BAYESIAN REGRESSION ANALYSIS

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0').?1

HERE IS THE DATA SET YOU WILL DO THE POSTERIOR ANALYSIS.

DATA SET =COLDAT

GROUPS	1	COLL6	OBSERVATIONS = 25
	2	COLL7	25
	3	COLL8	25
	4	COLL9	25
	5	COLL10	25
	6	COLL11	25
	7	COLL12	25
	8	COLL13	25
	9	COLL15	25
	10	COLL19	25

TYPE THE NUMBER OF THE GROUP YOU WANT (NONE=0).?1

```
VARIABLES  1      ENGLSH
           2       MATH
           3      NATSCI
           4       GPA

TYPE THE VARIABLE NUMBER FOR THE DEPENDENT VARIABLE (NONE=0)?4

TYPE THE NUMBER OF INDEPENDENT VARIABLES IN THE REGRESSION
EQUATION (DO NOT CONSIDER THE INTERCEPT AS A SEPARATE VARIABLE)?2
TYPE THE VARIABLE NUMBERS FOR THE  2    INDEPENDENT VARIABLES
(SEPARATE BY COMMAS, IF MORE THAN 1 INDEPENDENT VARAIABLES).
?1,2




HERE ARE THE SUMMARY OF THE POSTERIOR DISTRIBUTION OF THE
REGRESSION EQUATION, YOU MAY WISH TO RECORD THESE NUMBERS.

THE POSTERIOR DISTRIBUTION OF THE VARIANCE OF THE ERROR
IS AN INVERSE CHI-SQUARE VARIABLE ON  22.00  DEGREES OF
FREEDOM WITH THE SCALE PARAMETER   12.80.

THE POSTERIOR DISTRIBUTION OF THE REGRESSION COEFFICIENTS
BETA IS A  3-VARIATE T VARIABLE WITH

                   MEAN
INTERCEPT     =    0.81
  ENGLSH      =    0.04
   MATH       =    0.03

            POSTERIOR COVARIANCE MATRIX

        0.431       -0.013       -0.013
       -0.013        0.001       -0.000
       -0.013       -0.000        0.001

WHEN YOU ARE READY TO CONTINUE                      TYPE '1'?1
```

```
YOU HAVE THE FOLLOWING AVAILABLE OPTIONS FOR EXAMINATION OF
THE POSTERIOR DISTRIBUTIONS OF  THE REGRSSION EQUATION.

   1. THE DISTRIBUTION OF THE VARIANCE OF THE ERROR.
   2. POSTERIOR ANALYSES OF THE REGRESSION COEFFICIENTS BETA.
   3. THE OBSERVED AND PREDICTED VALUES FOR YOUR DATA.
   4. PREDICTIVE DISTRIBUTION FOR CHOSEN PREDICTOR VALUES.
   5. TO SAVE THE PARAMETERS OF REGRESSION EQUATION IN THE
      FILE FOR DECISION THEORY ANALYSIS
   6. EXIT THE MODEL

TYPE THE NUMBER OF OPTIONS YOU WANT
?5

WHAT 6 CHARACTER NAME DO YOU WANT TO USE TO REFER TO THIS
SET OF PARAMETERS ?GROUP1


THE PARAMETERS HAVE BEEN STORED IN YOUR FILE.
TO CONTINUE                                 TYPE '1'?1
```


```
YOU HAVE THE FOLLOWING AVAILABLE OPTIONS FOR EXAMINATION OF
THE POSTERIOR DISTRIBUTIONS OF  THE REGRSSION EQUATION.

   1. THE DISTRIBUTION OF THE VARIANCE OF THE ERROR.
   2. POSTERIOR ANALYSES OF THE REGRESSION COEFFICIENTS BETA.
   3. THE OBSERVED AND PREDICTED VALUES FOR YOUR DATA.
   4. PREDICTIVE DISTRIBUTION FOR CHOSEN PREDICTOR VALUES.
   5. TO SAVE THE PARAMETERS OF REGRESSION EQUATION IN THE
      FILE FOR DECISION THEORY ANALYSIS
   6. EXIT THE MODEL

TYPE THE NUMBER OF OPTIONS YOU WANT
```


```
?6
```

COMPONENT 25. MULTIPLE LINEAR REGRESSION ANALYSIS

1. NONINFORMATIVE PRIORS
2. INFORMATIVE PRIORS

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0').?1

BAYESIAN REGRESSION (NON-INFORMATIVE PRIOR)

1. BAYESIAN REGRESSION ANALYSIS

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0').?1

```
HERE IS THE DATA SET YOU WILL DO THE POSTERIOR ANALYSIS.

DATA SET =COLDAT

GROUPS     1       COLL6            OBSERVATIONS = 25
           2       COLL7                         25
           3       COLL8                         25
           4       COLL9                         25
           5       COLL10                        25
           6       COLL11                        25
           7       COLL12                        25
           8       COLL13                        25
           9       COLL15                        25
          10       COLL19                        25

 TYPE THE NUMBER OF THE GROUP YOU WANT (NONE=0).?2

VARIABLES  1       ENGLSH
           2        MATH
           3       NATSCI
           4        GPA

TYPE THE VARIABLE NUMBER FOR THE DEPENDENT VARIABLE (NONE=0)?4

TYPE THE NUMBER OF INDEPENDENT VARIABLES IN THE REGRESSION
EQUATION (DO NOT CONSIDER THE INTERCEPT AS A SEPARATE VARIABLE)?2
TYPE THE VARIABLE NUMBERS FOR THE  2    INDEPENDENT VARIABLES
(SEPARATE BY COMMAS, IF MORE THAN 1 INDEPENDENT VARAIABLES).
?1,2
```

```
HERE ARE THE SUMMARY OF THE POSTERIOR DISTRIBUTION OF THE
REGRESSION EQUATION, YOU MAY WISH TO RECORD THESE NUMBERS.

THE POSTERIOR DISTRIBUTION OF THE VARIANCE OF THE ERROR
IS AN INVERSE CHI-SQUARE VARIABLE ON  22.00  DEGREES OF
FREEDOM WITH THE SCALE PARAMETER   16.12.

THE POSTERIOR DISTRIBUTION OF THE REGRESSION COEFFICIENTS
BETA IS A  3-VARIATE T VARIABLE WITH

                      MEAN
INTERCEPT      =      0.97
  ENGLSH       =      0.03
   MATH        =      0.03

             POSTERIOR COVARIANCE MATRIX

       1.170        -0.026         -0.030
      -0.026         0.001         -0.000
      -0.030        -0.000          0.002

WHEN YOU ARE READY TO CONTINUE                      TYPE '1'?1




YOU HAVE THE FOLLOWING AVAILABLE OPTIONS FOR EXAMINATION OF
THE POSTERIOR DISTRIBUTIONS OF  THE REGRSSION EQUATION.

  1. THE DISTRIBUTION OF THE VARIANCE OF THE ERROR.
  2. POSTERIOR ANALYSES OF THE REGRESSION COEFFICIENTS BETA.
  3. THE OBSERVED AND PREDICTED VALUES FOR YOUR DATA.
  4. PREDICTIVE DISTRIBUTION FOR CHOSEN PREDICTOR VALUES.
  5. TO SAVE THE PARAMETERS OF REGRESSION EQUATION IN THE
     FILE FOR DECISION THEORY ANALYSIS
  6. EXIT THE MODEL

TYPE THE NUMBER OF OPTIONS YOU WANT
?5

WHAT 6 CHARACTER NAME DO YOU WANT TO USE TO REFER TO THIS
SET OF PARAMETERS ?GROUP2


THE PARAMETERS HAVE BEEN STORED IN YOUR FILE.
TO CONTINUE                                 TYPE '1'?-9999
```

```
CHOOSE ONE OF THE FOLLOWING OPTIONS:

     1.  RESTART AT THE BEGINNING OF THIS MODULE
     2.  SELECT A NEW MODULE
     3.  SELECT A NEW MODEL
     4.  SELECT A NEW COMPONENT
     5.  SELECT A NEW COMPONENT GROUP
     6.  EXIT

ENTER THE NUMBER OF THE OPTION THAT YOU WANT.?5
```

```
     COMPONENT GROUPS

1.   DATA MANAGEMENT FACILITY
2.   SIMPLE BAYESIAN PARAMETRIC MODELS
3.   DECISION THEORETIC MODELS
4.   BAYESIAN SIMULTANEOUS ESTIMATION
5.   BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.   BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.   ELEMENTARY CLASSICAL STATISTICS
8.   EXPLORATORY DATA ANALYSIS
9.   PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?3
```

```
COMPONENT GROUP 3.  DECISION THEORETIC MODELS

31.  UTILITIES AND EXPECTED UTILITIES
32.  EDUCATIONAL AND EMPLOYMENT SELECTION
33.  SELECTION OF EDUCATIONAL TREATMENT

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?33
```

```
        COMPONENT 33. ASSIGNMENT TO TREATMENT

     1. ASSIGNMENT WITH THRESHOLD UTILITIES
     2. ASSIGNMENT WITH CONDITIONAL UTILITIES

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?2
```

ASSIGNMENT WITH CONDITIONAL UTILITIES

1. ASSESSMENT OF UTILITIES
2. ASSIGNMENT TO TREATMENTS

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0').?1

ASSESSING CONDITIONAL UTILITY FUNCTION

THIS MODEL ASSUMES THAT FOR DECISION PURPOSES THE OUTCOME OF ANY ASSIGNMENT IS FULLY REPRESENTED BY THE STUDENTS' SCORES ON A POST-TREATMENT TEST.

IT IS FURTHER ASSUMED THAT THE UTILITY YOU ASSOCIATE WITH A POST-TREATMENT TEST SCORE DEPENDS ON THE IMPROVEMENT REPRESENTED BY THAT SCORE.

IN PARTICULAR, IT IS ASSUMED THAT THE UTILITY YOU ASSOCIATE WITH A STUDENT'S POSSIBLE POST-TREATMENT SCORE DEPENDS ON HIS SCORE ON SOME PRE-TREATMENT TEST.

FOR EXAMPLE, IF TWO STUDENTS WITH DIFFERENT PRE-TREATMENT SCORES OBTAIN THE SAME POST-TREATMENT SCORE, IT IS ASSUMED THAT YOU WOULD FEEL THERE WAS MORE UTILITY ASSOCIATED WITH THE LOWER SCORING STUDENT OBTAINING THE SCORE.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

```
PLEASE SPECIFY NAMES FOR THE TESTS (MAX = 6 CHARACTERS).

NAME OF PRE-TREATMENT TEST ?PRE

NAME OF POST-TREATMENT TEST ?POST

HERE ARE THE NAMES YOU ENTERED.

   PRE-TEST = PRE
  POST-TEST = POST

DID YOU ENTER THE NAMES CORRECTLY (NO=0 YES=1) ?1
```

```
PLEASE SPECIFY THE MINIMUM AND MAXIMUM SCORES FOR EACH TEST.

    YOUR TESTS MUST BE SCALED SO THAT THE TEST SCORES CAN BE
    DISPLAYED AS NUMBERS BETWEEN -999.99 AND 999.99.

    FOR EXAMPLE, IF YOUR SCORES RUN FROM 1000 TO 2000 YOU CAN
    DIVIDE THEM BY 10.  ALWAYS RESCALE BY DIVIDING.

    IF RESCALING IS NECESSARY, YOU WILL HAVE TO USE COMPONENT 11
    TO TRANSFORM YOUR DATA.

WHAT IS THE MINIMUM SCORE FOR PRE    ?0

WHAT IS THE MAXIMUM SCORE FOR PRE    ?4

HERE IS WHAT YOU ENTERED.

MINIMUM =  0          MAXIMUM =  4

ARE THESE SCORES CORRECT  (NO=0, YES=1)  ?1
```

```
WHAT IS THE MINIMUM SCORE FOR POST    ?0

WHAT IS THE MAXIMUM SCORE FOR POST    ?4

HERE IS WHAT YOU ENTERED.

MINIMUM =  0           MAXIMUM =  4

ARE THESE SCORES CORRECT  (NO=0, YES=1)  ?1
```

```
CONSIDER THE DISTRIBUTION OF PRE    SCORES FOR THE STUDENTS
THAT YOU MUST ASSIGN TO TREATMENT.

MINIMUM =  0           MAXIMUM =  4

PLEASE SPECIFY THREE PRE    SCORES.  ONE EACH FROM THE

     LOWER PART OF THE DISTRIBUTION
     MIDDLE PART OF THE DISTRIBUTION
     UPPER PART OF THE DISTRIBUTION

SPECIFY SCORES FOR WHICH YOU WOULD FEEL COMFORTABLE MAKING
JUDGMENTS ABOUT THE UTILITY OF POST    SCORES FOR STUDENTS
AT EACH OF THESE PRE    LEVELS.

PRE    SCORE FROM THE LOWER PART OF THE DISTRIBUTION ?1

PRE    SCORE FROM THE MIDDLE PART OF THE DISTRIBUTION ?2

PRE    SCORE FROM THE UPPER PART OF THE DISTRIBUTION ?3
```

```
HERE IS WHAT YOU ENTERED:

      LOW SCORE =        1.00
   MIDDLE SCORE =        2.00
    UPPER SCORE =        3.00

ARE THESE SCORES CORRECT  (NO=0, YES=1)  ?1
```

```
PLEASE CONSIDER THE FOLLOWING LABELS AND DECIDE,
FOR EACH OF YOUR PRETEST SCORES, WHAT POST-TEST SCORES
YOU WOULD ASSIGN TO EACH OF THESE LABELS.

  SUPERB   REALISTICALLY THE BEST THAT YOU COULD EXPECT

  GOOD     NOT THE BEST, BUT STILL PRETTY GOOD

  OKAY     ACCEPTABLE, BUT YOU WOULD HOPE FOR MORE

  MINIMAL  ANYTHING LESS THAN THIS IS UNACCEPTABLE

THE MODEL, OF COURSE, ASSUMES THAT FOR ANY GIVEN LABEL,
YOU WILL ASSIGN HIGHER POST-TEST SCORES FOR STUDENTS WITH HIGHER
PRETEST SCORES.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1
```

THE MODEL ALSO ASSUMES THAT IT IS EQUALLY IMPORTANT FOR EACH STUDENT TO OBTAIN HIS/HER GOOD POST-TEST SCORE, FOR EXAMPLE. IN OTHER WORDS, THE MODEL ASSUMES THAT ALL GOOD SCORES ARE TO BE ASSIGNED THE SAME UTILITY, IRRESPECTIVE OF THE CORRESPONDING PRETEST SCORE.

IT IS VERY IMPORTANT THAT YOU KEEP THIS IN MIND AS YOU SPECIFY WHICH POST SCORES YOU WOULD ASSIGN TO EACH OF THE LABELS FOR STUDENTS WITH DIFFERENT PRE SCORES.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

PLEASE SPECIFY WHICH POST SCORES YOU WOULD ASSIGN TO EACH OF THE LABELS IF THE PRETEST SCORE IS IN THE MIDDLE PART.

PRE SCORE = 2

RECALL FOR POST : MINIMUM = 0.00 MAXIMUM = 4.00

SUPERB SCORE (REALISTICALLY THE BEST) ?3

GOOD SCORE = ?2.5

OKAY SCORE (ACCEPTABLE) ?2

MINIMAL SCORE (ANYTHING LESS IS UNACCEPTABLE) ?1.5

AT THE MIDDLE LEVEL OF PRE I.E. SCORE = 2 YOU ENTERED

SUPERB SCORE = 3
GOOD SCORE = 2.5
OKAY SCORE = 2
MINIMAL SCORE = 1.5

ARE THESE SCORES CORRECT (NO=0, YES=1) ?1

NOW WE SHALL ASSIGN POST-TEST SCORES AT LOW & HIGH VALUES OF THE PRETEST SCORE, ONE LABEL AT A TIME.

HERE ARE THE POST SCORES YOU HAVE ALREADY LABELLED.

	POST			
PRE	MINIMAL	OKAY	GOOD	SUPERB
1.00				
2.00	1.50	2.00	2.50	3.00
3.00				

FOR EACH OF THE FOLLOWING STUDENTS PLEASE SPECIFY THE POST SCORE YOU WOULD ASSIGN TO THE LABEL ** MINIMAL **

ALL SCORES WITH THIS LABEL ARE ASSIGNED THE SAME UTILITY.

A STUDENT WITH PRE SCORE = 1 ?0.5

A STUDENT WITH PRE SCORE = 3 ?2.5

HERE ARE THE POST SCORES YOU HAVE ALREADY LABELLED.

	POST			
PRE	MINIMAL	OKAY	GOOD	SUPERB
1.00	0.50			
2.00	1.50	2.00	2.50	3.00
3.00	2.50			

ARE THESE SCORES CORRECT (NO=0, YES=1) ?1

FOR EACH OF THE FOLLOWING STUDENTS PLEASE SPECIFY THE POST SCORE YOU WOULD ASSIGN TO THE LABEL ** OKAY **

ALL SCORES WITH THIS LABEL ARE ASSIGNED THE SAME UTILITY.

A STUDENT WITH PRE SCORE = 1 ?1

A STUDENT WITH PRE SCORE = 3 ?3

HERE ARE THE POST SCORES YOU HAVE ALREADY LABELLED.

PRE	MINIMAL	OKAY	GOOD	SUPERB
1.00	0.50	1.00		
2.00	1.50	2.00	2.50	3.00
3.00	2.50	3.00		

ARE THESE SCORES CORRECT (NO=0, YES=1) ?1

FOR EACH OF THE FOLLOWING STUDENTS PLEASE SPECIFY THE POST SCORE YOU WOULD ASSIGN TO THE LABEL ** GOOD **

ALL SCORES WITH THIS LABEL ARE ASSIGNED THE SAME UTILITY.

A STUDENT WITH PRE SCORE = 1 ?1.5

A STUDENT WITH PRE SCORE = 3 ?3.5

HERE ARE THE POST SCORES YOU HAVE ALREADY LABELLED.

PRE	MINIMAL	OKAY	GOOD	SUPERB
1.00	0.50	1.00	1.50	
2.00	1.50	2.00	2.50	3.00
3.00	2.50	3.00	3.50	

ARE THESE SCORES CORRECT (NO=0, YES=1) ?1

FOR EACH OF THE FOLLOWING STUDENTS PLEASE SPECIFY THE POST SCORE YOU WOULD ASSIGN TO THE LABEL ** SUPERB **

ALL SCORES WITH THIS LABEL ARE ASSIGNED THE SAME UTILITY.

A STUDENT WITH PRE SCORE = 1 ?2

A STUDENT WITH PRE SCORE = 3 ?4

PLEASE INDICATE FOR THE P VALUES PRESENTED IF YOU PREFER THE FOR SURE OR THE CHANCE OPTION BELOW.

STUDENT'S PRETEST SCORE = 2

```
      ------------------------------
 I                              I
 I        2.25   P    CHANCE    I   INDIFFERENT=0
 I        2.00        FOR SURE  I   FOR SURE    =1
 I        1.75  1-P   CHANCE    I   CHANCE      =2
 I                              I   RESTART     =3
      ------------------------------
```

```
IF YOU ARE INDIFFERENT BETWEEN THE OPTIONS, TYPE '0'.
IF YOU PREFER THE FOR SURE OPTION,          TYPE '1'.
IF YOU PREFER THE CHANCE OPTION,            TYPE '2'.
IF YOU WANT TO RESTART THE QUESTIONING,     TYPE '3'.

WHICH WOULD YOU PREFER IF P WERE   .5           ?1
WHICH WOULD YOU PREFER IF P WERE   .85          ?2
WHICH WOULD YOU PREFER IF P WERE   .75          ?2
WHICH WOULD YOU PREFER IF P WERE   .65          ?2
WHICH WOULD YOU PREFER IF P WERE   .55          ?0
```

PLEASE INDICATE FOR THE P VALUES PRESENTED IF YOU PREFER THE FOR SURE OR THE CHANCE OPTION BELOW.

STUDENT'S PRETEST SCORE = 2

```
      ------------------------------
 I                              I
 I        2.50   P    CHANCE    I   INDIFFERENT=0
 I        2.25        FOR SURE  I   FOR SURE    =1
 I        2.00  1-P   CHANCE    I   CHANCE      =2
 I                              I   RESTART     =3
      ------------------------------
```

```
IF YOU ARE INDIFFERENT BETWEEN THE OPTIONS, TYPE '0'.
IF YOU PREFER THE FOR SURE OPTION,          TYPE '1'.
IF YOU PREFER THE CHANCE OPTION,            TYPE '2'.
IF YOU WANT TO RESTART THE QUESTIONING,     TYPE '3'.

WHICH WOULD YOU PREFER IF P WERE   .65          ?2
WHICH WOULD YOU PREFER IF P WERE   .45          ?0
```

THE P VALUES YOU SAID WOULD MAKE YOU INDIFFERENT BETWEEN THE OPTIONS IN SITUATIONS 1 AND 2 BELOW IMPLY THAT YOU WOULD BE INDIFFERENT BETWEEN THE OPTIONS IN THE OTHER TWO SITUATIONS FOR THE P VALUES DISPLAYED.

	SITUATIONS 1	2	3	4
P CHANCE	2.25	2.50	2.50	2.50
FOR SURE	2.00	2.25	2.00	2.25
1-P CHANCE	1.75	2.00	1.75	1.75
	P = .55	P = .45	P = .35	P = .65

ARE YOU INDIFFERENT FOR THESE P VALUES (NO=0 YES=1)?1

PLEASE INDICATE FOR THE P VALUES PRESENTED IF YOU PREFER THE FOR SURE OR THE CHANCE OPTION BELOW.

STUDENT'S PRETEST SCORE = 2

2.75	P	CHANCE	INDIFFERENT=0
2.50		FOR SURE	FOR SURE =1
2.25	1-P	CHANCE	CHANCE =2
			RESTART =3

IF YOU ARE INDIFFERENT BETWEEN THE OPTIONS, TYPE '0'.
IF YOU PREFER THE FOR SURE OPTION, TYPE '1'.
IF YOU PREFER THE CHANCE OPTION, TYPE '2'.
IF YOU WANT TO RESTART THE QUESTIONING, TYPE '3'.

WHICH WOULD YOU PREFER IF P WERE .25 ?1
WHICH WOULD YOU PREFER IF P WERE .8 ?2
WHICH WOULD YOU PREFER IF P WERE .65 ?2
WHICH WOULD YOU PREFER IF P WERE .55 ?0

```
PLEASE INDICATE FOR THE P VALUES PRESENTED IF YOU PREFER
THE FOR SURE OR THE CHANCE OPTION BELOW.

STUDENT'S PRETEST SCORE =  2
          ------------------------------
        I                              I
        I        3.00    P   CHANCE    I   INDIFFERENT=0
        I        2.75        FOR SURE  I   FOR SURE   =1
        I        2.50   1-P  CHANCE    I   CHANCE     =2
        I                              I   RESTART    =3
          ------------------------------
WHICH WOULD YOU PREFER IF P WERE   .65            ?2
WHICH WOULD YOU PREFER IF P WERE   .45            ?1
WHICH WOULD YOU PREFER IF P WERE   .6             ?2
WHICH WOULD YOU PREFER IF P WERE   .55            ?2
WHICH WOULD YOU PREFER IF P WERE   .5             ?0
```

```
THE P VALUES YOU SAID WOULD MAKE YOU INDIFFERENT BETWEEN
THE OPTIONS IN SITUATIONS 1 AND 2 BELOW IMPLY THAT
YOU WOULD BE INDIFFERENT BETWEEN THE OPTIONS IN THE OTHER
TWO SITUATIONS FOR THE P VALUES DISPLAYED.

                                    SITUATIONS
             ----- 1 --------- 2 --------- 3 --------- 4 -
  P CHANCE        2.75        3.00        3.00        3.00
  FOR SURE        2.50        2.75        2.50        2.75
1-P CHANCE        2.25        2.50        2.25        2.25

              P = .55     P = .50     P = .38     P = .69

ARE YOU INDIFFERENT FOR THESE P VALUES (NO=0 YES=1)?1
```

HERE ARE FOUR ADDITIONAL SITUATIONS AND SETS OF P VALUES FOR THESE SITUATIONS THAT ARE COHERENT WITH YOUR STATED PREFERENCES.

	----- 1 ---------	2 ---------	3 ---------	4 -
P CHANCE	2.00	2.25	2.25	2.50
FOR SURE	1.75	1.75	2.00	2.00
1-P CHANCE	1.50	1.50	1.50	1.50

EXAMPLES OF COHERENT PROBABILITY SETS

P = .25	P = .15	P = .62	P = .42
P = .50	P = .35	P = .71	P = .52
P = .75	P = .62	P = .83	P = .69

THESE SETS OF P VALUES ARE PRESENTED TO GIVE YOU AN IDEA OF SETS OF P VALUES THAT ARE COHERENT WITH WHAT YOU HAVE PREVIOUSLY SAID ABOUT YOUR PREFERENCES.

CONSIDER SITUATION 1 AND DECIDE WHAT P VALUE WOULD MAKE YOU INDIFFERENT IN THIS SITUATION. THE P VALUE DOES NOT HAVE TO BE ONE OF THOSE DISPLAYED.

WHAT P DO YOU WANT FOR SITUATION 1 ?.5

HERE ARE THE UTILITIES CONSISTENT WITH YOUR PREFERENCES.

SCORE	UTILITY
1.50	0.00
1.75	0.18
2.00	0.37
2.25	0.52
2.50	0.70
2.75	0.85
3.00	1.00

THESE UTILITIES HAVE BEEN STORED IN YOUR PERSONAL FILE.
HOWEVER, THEY WILL BE LOST IF YOU EXIT COMPONENT 33
OR END THIS RUN OF CADA.
THEREFORE IT IS ADVISABLE TO WRITE THEM DOWN FOR FUTURE USE.

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

```
        ASSIGNMENT WITH CONDITIONAL UTILITIES

        1. ASSESSMENT OF UTILITIES
        2. ASSIGNMENT TO TREATMENTS

 IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER ( ELSE '0' ).?2
```

```
                  ASSIGNMENT TO TREATMENT
IN ORDER TO MAKE ASSIGNMENTS TO TREATMENTS YOU MUST PROVIDE
THE PREDICTOR SCORES FOR EACH OF THE PERSONS TO BE ASSIGNED
AND THE PARAMETERS OF THE EQUATIONS USED TO PREDICT THE
OUTCOME UNDER EACH OF THE TREATMENTS.

THE NAME OF YOUR DATA SET IS COLDAT

YOUR DATA SET CONTAINS THE FOLLOWING GROUPS

 1  COLL6     # OF CASES =   25
 2  COLL7     # OF CASES =   25
 3  COLL8     # OF CASES =   25
 4  COLL9     # OF CASES =   25
 5  COLL10    # OF CASES =   25
 6  COLL11    # OF CASES =   25
 7  COLL12    # OF CASES =   25
 8  COLL13    # OF CASES =   25
 9  COLL15    # OF CASES =   25
10  COLL19    # OF CASES =   25

WHICH GROUP DO YOU WANT TO USE (NONE = 0)  ?3
```

```
THE NAMES OF THE VARIABLES ARE :

     1. ENGLSH
     2.  MATH
     3. NATSCI
     4.  GPA

DO THESE INCLUDE PRETEST & ALL PREDICTORS YOU NEED (NO=0 YES=1) ?1

WHICH VARIABLE IS THE PRETEST SCORE (ENTER VARIABLE #)  ?4

ARE THE PARAMETERS OF THE PREDICTION EQUATIONS ALSO STORED
IN YOUR PERSONAL FILE              (NO=0 YES=1) ?1

NAMES OF THE PREDICTIONS EQUATIONS IN YOUR PERSONAL FILE ARE

         EQUATION 1 = GROUP1
         EQUATION 2 = GROUP2

WHICH DO YOU WANT FOR TREATMENT  1    (0 IF NONE OF THESE)  ?1

WHICH DO YOU WANT FOR TREATMENT  2    (0 IF NONE OF THESE)  ?2
```

ASSIGNMENT TO TREATMENT

PLEASE ENTER A NAME FOR EACH TREATMENT, UPTO 6 CHARACTERS

ENTER NAME OF TREATMENT 1 ?ONE

ENTER NAME OF TREATMENT 2 ?TWO

EACH REGRESSION EQUATION WAS CALCULATED USING A CERTAIN SET OF PREDICTORS IN A PARTICULAR ORDER. EACH OF THESE PREDICTORS MUST BE AMONG THE VARIABLES IN YOUR CURRENT DATA SET. HOWEVER, THEIR ORDER IN THE DATA MAY DIFFER FROM THE ORDER IN THE EQUATION. ALSO, SOME OF THE VARIABLES MAY NOT BE AMONG THE PREDICTORS.

FOR EACH REGRESSION EQUATION, YOU WILL BE PRESENTED WITH THE NAMES OF THE VARIABLES IN THE CURRENT DATA SET. FOR EACH VARIABLE, IF IT IS ONE OF THE PREDICTORS, ENTER A NUMBER TO SHOW WHICH ONE IT IS. FOR EXAMPLE, IF IT IS THE SECOND PREDICTOR, TYPE 2.

IF THE VARIABLE IS NOT A PREDICTOR IN THE EQUATION, TYPE 0.

WHEN YOU ARE READY TO CONTINUE, TYPE 1. ?1

```
THE REGRESSION EQUATION FOR TREATMENT  1    IS NAMED GROUP1
PLEASE IDENTIFY THE PREDICTORS USED IN THIS EQUATION

VARIABLE  1    ENGLSH  ?1
VARIABLE  2     MATH   ?2
VARIABLE  3    NATSCI  ?0
VARIABLE  4     GPA    ?0

HAVE YOU ENTERED EVERYTHING CORRECTLY (NO=0, YES=1)  ?1
```

```
THE REGRESSION EQUATION FOR TREATMENT  2    IS NAMED GROUP2
PLEASE IDENTIFY THE PREDICTORS USED IN THIS EQUATION

VARIABLE  1    ENGLSH  ?1
VARIABLE  2     MATH   ?2
VARIABLE  3    NATSCI  ?0
VARIABLE  4     GPA    ?0

HAVE YOU ENTERED EVERYTHING CORRECTLY (NO=0, YES=1)  ?1
```

THE EXPECTED UTILITY OF EACH TREATMENT WILL BE COMPUTED FOR EACH STUDENT IN YOUR DATA.

THERE WILL BE A PAUSE FOR CALCULATIONS.

IF YOU WERE TO ASSIGN ALL OF THE STUDENTS TO THE SAME TREATMENT THEN THE AVERAGE EXPECTED UTILITIES WOULD BE, IN A RANGE FROM 0 TO 100 :

43.8 FOR TREATMENT ONE
46.9 FOR TREATMENT TWO

IF YOU WANT TO ASSIGN ALL OF THE STUDENTS TO JUST ONE OF THE TREATMENTS YOU SHOULD PICK THE ONE WITH THE GREATER AVERAGE EXPECTED UTILITY.

DO YOU NOW WANT TO CONSIDER ASSIGNING DIFFERENT STUDENTS TO DIFFERENT TREATMENTS (NO=0 YES=1) ?1

NOTE ***** EXPECTED UTILITIES HAVE BEEN MULTIPLIED BY 100.

ARE THERE ANY LIMITS ON THE NUMBER OF STUDENTS THAT CAN BE ASSIGNED TO EITHER OF THE TREATMENTS (NO=0 YES=1) ?1

```
TOTAL NUMBER OF STUDENTS =  25

ENTER LIMITS ON NUMBERS OF STUDENTS THAT CAN BE ASSIGNED TO
THE TREATMENTS. ENTER 0 IF THERE IS NO LIMIT, WHICH IS THE SAME
AS THE LIMIT BEING  25   OR LARGER.
IF BOTH TREATMENTS HAVE LIMITS, THEIR SUM MUST BE AT LEAST  25

WHAT IS THE LIMIT FOR TREATMENT ONE      ?15
WHAT IS THE LIMIT FOR TREATMENT TWO      ?15
```

STUDENT	ENGLSH	MATH	NATSCI	GPA	EXP. UTILITY ONE	TWO	ASSIGN TO
1	16.00	20.00	21.00	1.70	53.3	57.3	TWO
2	17.00	22.00	18.00	2.90	12.9	17.8	TWO
3	16.00	28.00	24.00	2.80	18.6	25.4	TWO
4	12.00	12.00	5.00	1.30	54.4	58.0	TWO
5	16.00	28.00	23.00	2.80	18.6	25.4	TWO
6	16.00	11.00	11.00	1.50	51.8	53.8	ONE
7	21.00	20.00	23.00	1.30	77.2	77.0	ONE
8	14.00	24.00	22.00	2.60	19.0	25.8	TWO
9	24.00	19.00	25.00	2.10	49.2	50.0	ONE
10	26.00	35.00	28.00	2.50	53.5	56.9	TWO

```
WHEN YOU ARE READY TO CONTINUE TYPE 1.  ?1
```

STUDENT	ENGLSH	MATH	NATSCI	GPA	EXP. UTILITY ONE	TWO	ASSIGN TO
11	18.00	15.00	14.00	1.10	75.3	75.3	ONE
12	20.00	22.00	26.00	1.50	70.5	71.6	ONE
13	22.00	30.00	30.00	2.40	45.0	49.6	TWO
14	15.00	16.00	18.00	2.00	34.3	39.2	TWO
15	19.00	29.00	24.00	2.20	47.2	52.6	TWO
16	16.00	19.00	19.00	1.10	76.1	77.3	ONE
17	14.00	10.00	9.00	1.00	68.1	69.2	ONE
18	21.00	26.00	17.00	2.30	43.1	47.3	TWO
19	18.00	18.00	16.00	2.30	29.5	33.8	TWO
20	22.00	17.00	22.00	2.40	31.0	33.6	TWO

WHEN YOU ARE READY TO CONTINUE TYPE 1. ?1

STUDENT	ENGLSH	MATH	NATSCI	GPA	EXP. UTILITY ONE	TWO	ASSIGN TO
21	18.00	14.00	21.00	2.10	33.2	36.5	TWO
22	24.00	17.00	22.00	1.80	59.9	59.4	ONE
23	19.00	5.00	14.00	1.80	37.6	38.2	ONE
24	20.00	14.00	21.00	3.20	6.0	8.2	ONE
25	18.00	17.00	21.00	2.30	28.5	32.7	TWO

ASSIGNMENT TOTALS: 10 FOR ONE 15 FOR TWO

WHEN YOU ARE READY TO CONTINUE TYPE 1. ?1

DO YOU WANT TO CHANGE THE LIMITS ON ASSIGNMENTS (NO=0 YES=1) ?0

ASSIGNMENT WITH CONDITIONAL UTILITIES

1. ASSESSMENT OF UTILITIES
2. ASSIGNMENT TO TREATMENTS

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0').?0

COMPONENT 33. ASSIGNMENT TO TREATMENT

1. ASSIGNMENT WITH THRESHOLD UTILITIES
2. ASSIGNMENT WITH CONDITIONAL UTILITIES

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?0

COMPONENT GROUP 3. DECISION THEORETIC MODELS

31. UTILITIES AND EXPECTED UTILITIES
32. EDUCATIONAL AND EMPLOYMENT SELECTION
33. SELECTION OF EDUCATIONAL TREATMENT

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?0

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?

Component Group 4

```
COMPONENT GROUPS

1.    DATA MANAGEMENT FACILITY
2.    SIMPLE BAYESIAN PARAMETRIC MODELS
3.    DECISION THEORETIC MODELS
4.    BAYESIAN SIMULTANEOUS ESTIMATION
5.    BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.    BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.    ELEMENTARY CLASSICAL STATISTICS
8.    EXPLORATORY DATA ANALYSIS
9.    PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?4
```

```
COMPONENT GROUP 4.  BAYESIAN SIMULTANEOUS ESIMATION

41.   SIMULTANEOUS ESTIMATION OF PROPORTIONS
42.   SIMULTANEOUS ESTIMATION OF MEANS
43.   SIMULTANEOUS PREDICTION IN M GROUPS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?41
```

COMPONENT 41. SIMULTANEOUS ESTIMATION OF PROPORTIONS

1. ARCSINE TRANSFORMATION

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?1

ARCSINE TRANSFORMATION

1. PRIOR DISTRIBUTION
2. POSTERIOR DISTRIBUTIONS (EQUAL GROUP SIZES)
3. POSTERIOR DISTRIBUTIONS (UNEQUAL GROUP SIZES)

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1

SPECIFICATION OF A PRIOR FOR SIMULTANEOUS PROPORTIONS

THIS MODULE WILL ASSIST YOU IN SPECIFYING A PRIOR DISTRIBUTION FOR YOUR ANALYSIS. THE ASSUMPTION IS MADE THAT YOUR INFORMATION ABOUT THE GROUPS YOU PLAN TO OBSERVE (OR HAVE OBSERVED) - AND ABOUT ANY OTHER GROUPS YOU MIGHT OBSERVE - IS EXCHANGEABLE. THUS IT IS ASSUMED YOUR INFORMATION ABOUT A GIVEN GROUP IS EQUIVALENT TO YOUR INFORMATION ABOUT ANY OTHER GROUP AS CONCERNS THE PROBABILITY OF SUCCESS IN EACH OF THESE GROUPS.

CONSIDER A PARTICULAR GROUP UNDER STUDY. WE NEED TO ASSESS YOUR KNOWLEDGE CONCERNING THE PROBABILITY OF SUCCESS (PI) FOR THIS GROUP.

WE BEGIN BY ASKING YOU TO SPECIFY THE 25TH, 50TH AND 75TH PERCENTILES OF YOUR PRIOR DISTRIBUTION FOR PI.

SPECIFY 50TH. YOUR BETTING ODDS ARE EVEN THAT PI IS GREATER THAN THIS VALUE.?.8

SPECIFY 25TH. YOUR BETTING ODDS ARE 3 TO 1 THAT PI IS GREATER THAN THIS VALUE.?.6

SPECIFY 75TH. YOUR BETTING ODDS ARE 1 TO 3 THAT PI IS GREATER THAN THIS VALUE.?.9

POSSIBLE APPROXIMATE DISTRIBUTIONS ARE BEING COMPUTED.

HERE ARE SOME OF THE PERCENTILES OF FOUR BETA DISTRIBUTIONS
THAT HAVE BEEN FITTED TO YOUR PERCENTILE SPECIFICATIONS.

	10TH	25TH	50TH	75TH	90TH
1	.45	.61	.77	.89	.95
2	.54	.68	.80	.89	.95
3	.44	.61	.77	.89	.95
4	.49	.64	.78	.89	.95

COMPARE THE PERCENTILES OF THESE DISTRIBUTIONS AND DECIDE
WHICH MOST CLOSELY CORRESPONDS TO YOUR PRIOR BELIEFS.
YOU CAN EITHER TENTATIVELY ACCEPT THIS DISTRIBUTION OR
RESPECIFY THE PERCENTILES.

IF YOU WANT ONE OF THESE DISTRIBUTIONS TYPE ITS NUMBER.
IF YOU WANT TO RESPECIFY THE PERCENTILES   TYPE '0'.
?2

HERE ARE SOME CHARACTERISTICS OF THE BETA DISTRIBUTION YOU
ARE NOW CONSIDERING.

HYPOTHETICAL SAMPLE SIZE (M)	6.37
10TH PERCENTILE	.54
25TH PERCENTILE	.68
50TH (MEDIAN)	.80
75TH PERCENTILE	.89
90TH PERCENTILE	.95
50% HDR	.77 - .96
75% HDR	.66 - .99
95% HDR	.47 - .99

IF YOU DO NOT FEEL THAT THE HYPOTHETICAL SAMPLE SIZE (T)
REFLECTS YOUR PRIOR INFORMATION ABOUT PI YOU CAN SPECIFY A
DIFFERENT VALUE FOR M. THIS WILL NOT AFFECT THE MEDIAN BUT
WILL CHANGE THE HDRS AND OTHER PERCENTILES. A LARGER M WILL
RESULT IN SHORTER INTERVALS, AND A SMALLER M IN LONGER ONES.

IF YOU WANT TO CHANGE T, TYPE THE NEW VALUE (MIN= 6.367).
IF YOU DO NOT WANT TO CHANGE T,   TYPE '0'
?12

```
HERE ARE SOME CHARACTERISTICS OF THE BETA DISTRIBUTION YOU
ARE NOW CONSIDERING.

        HYPOTHETICAL SAMPLE SIZE (M)      12.00
        10TH PERCENTILE                     .63
        25TH PERCENTILE                     .72
        50TH  (MEDIAN)                      .80
        75TH PERCENTILE                     .87
        90TH PERCENTILE                     .92
        50% HDR                         .76 - .91
        75% HDR                         .69 - .94
        95% HDR                         .57 - .98

IF YOU WANT TO CHANGE T, TYPE THE NEW VALUE (MIN=  6.367).
IF YOU DO NOT WANT TO CHANGE T,     TYPE '0'
?0

TO CHANGE THE CENTERING OF THE DISTRIBUTION, SPECIFY
A DIFFERENT MEDIAN.  THIS WILL NOT AFFECT THE VALUE OF M.
IF YOU WANT TO CHANGE MEDIAN TYPE NEW VALUE ELSE '0'.?0




THIS COMPLETES THE SPECIFICATION OF THE POIOR FOR
PROPORTION (PI).  YOU MAY WISH TO RECORD THE
PARAMETERS A AND B.

        PARAMETER A                       9.44
        PARAMETER B                       2.56
        MODE                               .84
        10TH PERCENTILE                    .63
        25TH PERCENTILE                    .72
        50TH  (MEDIAN)                     .80
        75TH PERCENTILE                    .87
        90TH PERCENTILE                    .92
        50% HDR                        .76 - .91
        75% HDR                        .69 - .94
        95% HDR                        .57 - .98

IF YOU WANT TO CONTINUE THE PROCEDURE TYPE '1'
IF YOU WANT TO CHANGE YOURS PRIOR     TYPE '2'
?1
```

YOU MUST NOW SPECIFY THE IMPORTANCE OF THE INFORMATION YOU HAVE JUST GIVEN RELATIVE TO THE DATA YOU PLAN TO OBSERVE (OR HAVE OBSERVED).

THIS IMPORTANCE IS ASSESSED BY COMPARING YOUR KNOWLEDGE TO THAT OBTAINED FROM EXACT INFORMATION CONCERNING THE PROBABILITIES OF SUCCESS FOR SOME NUMBER OF GROUPS. THESE NUMBERS WILL BE USED, TOGETHER WITH THE ACTUAL NUMBER OF GROUPS YOU OBSERVE, TO DETERMINE THE RELATIVE IMPORTANCE OF PRIOR AND SAMPLE INFORMATION.

WHEN YOU ARE READY TO CONTINUE   TYPE '1'?1

FIRST CONSIDER THE OVERALL MEAN PROBABILITY OF SUCCESS TAKEN ACROSS ALL GROUPS YOU MIGHT CONCEIVABLY OBSERVE. HOW MANY GROUPS (T1) IS YOUR KNOWLEDGE CONCERNING THIS MEAN WORTH (IN MOST CASES A SMALL VALUE - BETWEEN 1 & 5 - IS A GOOD CHOICE.)
T1 = ?3

NEXT CONSIDER THE BETWEEN GROUPS VARIANCE FOR PROBABILITY OF SUCCESS, AGAIN TAKEN ACROSS ALL GROUPS. HOW MANY GROUPS (T2) IS YOUR KNOWLEDGE CONCERNING THIS VARIANCE WORTH (A VALUE BETWEEN 5 AND 100.)
T2 = ?7

IF YOU ARE NOT GOING DIRECTLY TO THE POSTERIOR ANALYSES, YOU SHOULD RECORD THE VALUES OF T1 AND T2.

```
IF YOU WANT TO DO THE POSTERIOR ANALYSIS        TYPE '1'
            TO EXIT THE MODULE                  TYPE '0'
?1
```

IF ALL YOUR GROUP SAMPLE SIZES ARE THE SAME TYPE '1' ELSE '0'.
?1

M-GROUP PROPORTIONS POSTERIOR DISTRIBUTIONS

```
THIS MODULE OBTAINS POSTERIOR DISTRIBUTIONS FOR THE PROBABILITIES
OF SUCCESS (PI) IN M DIFFERENT GROUPS FOR THE CASE IN WHICH SAMPLE
SIZES FOR ALL GROUPS ARE THE SAME.  A MODEL USING THE VARIANCE-
STABILIZING (ARC-SINE) TRANSFORMATION ON THE SAMPLE PROPORTIONS
IS EMPLOYED, BUT ALL RESULTS ARE GIVEN IN TERMS OF PI VALUES.

AT PRESENT, PRIOR PARAMETER VALUES ARE

 A =    9.44      B =    2.56
 T1=    3.00      T2=    7.00

IF YOU WANT TO CONTINUE               TYPE '1'
            TO INPUT NEW VALUES       TYPE '0'
?1


INPUT THE ACTUAL NUMBER OF GROUPS (M) IN YOUR ANALYSIS.
M = ?35

NOW INPUT NUMBER OF OBSERVATIONS (N) PER GROUP ( N > 5 ).
N = ?12
```

NOW ENTER YOUR SAMPLE DATA AS A FREQUENCY DISTRIBUTION OF THE NUMBER OF GROUPS (OUT OF A TOTAL OF 35) HAVING X SUCCESSES FOR EACH VALUE OF X FROM 0 TO 12 WHICH HAS BEEN OBSERVED FOR AT LEAST ONE GROUP.

INPUT NUMBER OF SUCCESSES, FOLLOWED BY FREQUENCY (NUMBER OF GROUPS). THUS, IF 3 GROUPS HAD 0 SUCCESSES, YOU WOULD TYPE 0,3 .

?8,3
?9,4
?10,5
?11,12
?12,11

NOW, THE SUM OF THE NUMBER OF GROUPS IS EQUAL TO 35

IF YOU WANT TO CONTINUE THE ANALYSIS TYPE '1'
TO REENTER YOUR DATA TYPE '0'
?1

BEFORE GOING ON, SOME LENGTHY COMPUTATIONS ARE REQUIRED. PLEASE BE PATIENT.

JOINT AND MARGINAL POINT ESTIMATES

X	FREQUENCY	X/N	PI(JOINT)*	PI(MARG.)**
8	3	0.667	0.827	0.799
9	4	0.750	0.832	0.823
10	5	0.833	0.839	0.848
11	12	0.917	0.846	0.876
12	11	1.000	0.859	0.921

* JOINT ESTIMATES ARE BASED ON THE JOINT MODE OF THE TRANSFORMED PI VALUES. THEY ARE NOT IDENTICAL TO THE JOINT MODE OF THE PI VALUES THEMSELVES.

** MARGINAL ESTIMATES ARE BASED ON THE MEANS OF THE TRANSFORMED PI VALUES. THEY ARE NOT IDENTICAL TO THE MEANS OF THE PI VALUES THEMSELVES.

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1

APPROXIMATE PERCENTILES FOR THE PI VALUES
(BASED ON A NORMAL APPROXIMATION TO THE MARGINAL POSTERIOR
DISTRIBUTIONS OF THE TRANSFORMED PI VALUES)

X	FREQ.	X/N	10TH	25TH	50TH	75TH	90TH
8	3	0.667	0.699	0.748	0.799	0.845	0.882
9	4	0.750	0.729	0.775	0.823	0.866	0.900
10	5	0.833	0.759	0.803	0.848	0.888	0.919
11	12	0.917	0.793	0.835	0.876	0.912	0.940
12	11	1.000	0.847	0.885	0.921	0.951	0.972

IF YOU WANT THE PROBABILITIES THAT PI EXCEEDS CERTAIN VALUES
WHICH YOU SPECIFY (UP TO 5 AT A TIME), TYPE THE NUMBER OF
VALUES YOU WISH TO SPECIFY, ELSE '0'
?4

VALUE 1 ?.7
VALUE 2 ?.8
VALUE 3 ?.9
VALUE 4 ?.95

APPROXIMATE PROBABILITY THAT PI EXCEEDS PI(0)
(BASED ON A NORMAL APPROXIMATION TO THE MARGINAL POSTERIOR
DISTRIBUTIONS OF THE TRANSFORMED PI VALUES)

			VALUES OF PI(0)			
X	FREQ.	X/N	0.700	0.800	0.900	0.950
8	3	0.667	0.90	0.49	0.05	0.00
9	4	0.750	0.95	0.63	0.10	0.01
10	5	0.833	0.98	0.77	0.19	0.02
11	12	0.917	0.99	0.88	0.33	0.06
12	11	1.000	1.00	0.98	0.66	0.25

HOW MANY MORE VALUES DO YOU WISH TO SPECIFY (1-5), NONE=0?0

```
        ARCSINE TRANSFORMATION

      1. PRIOR DISTRIBUTION
      2. POSTERIOR DISTRIBUTIONS (EQUAL GROUP SIZES)
      3. POSTERIOR DISTRIBUTIONS (UNEQUAL GROUP SIZES)

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?3
```

```
       M-GROUP PROPORTIONS POSTERIOR DISTRIBUTIONS

THIS MODULE OBTAINS POSTERIOR DISTRIBUTIONS FOR THE PROBABILITIES
OF SUCCESS (PI) IN M DIFFERENT GROUPS FOR THE CASE IN WHICH SAMPLE
SIZES ARE NOT THE SAME FOR ALL GROUPS.  A MODEL USING THE VARIANCE
STABILIZING (ARC-SINE) TRANSFORMATION ON THE SAMPLE PROPORTIONS
IS EMPLOYED, BUT ALL RESULTS ARE GIVEN IN TERMS OF PI VALUES.

AT PRESENT, PRIOR PARAMETER VALUES ARE

 A =    9.44      B =    2.56
 T1=    3.00      T2=    7.00

IF YOU WANT TO CONTINUE              TYPE '1'
            TO INPUT NEW VALUES      TYPE '0'
?0
```

```
INPUT PARAMETERS (A AND B) OF YOUR FITTED PRIOR DISTRIBUTION
FOR A TYPICAL GROUP PROBABILITY OF SUCCESS (PI).
A = ?6
B = ?4

NOW INPUT PRIOR NUMBER OF GROUPS (T1 AND T2) ASSOCIATED WITH YOUR
KNOWLEDGE CONCERNING THE MEAN AND VARIANCE OF THE PI VALUES.
T1 (# OF GROUPS FOR MEAN)            = ?3
T2 (# OF GROUPS FOR VARIANCE >=5 ) = ?7

AT PRESENT, PRIOR PARAMETER VALUES ARE

 A =    6.00      B =    4.00
 T1=    3.00      T2=    7.00

IF YOU WANT TO CONTINUE                TYPE '1'
            TO INPUT NEW VALUES        TYPE '0'
?1
```

```
INPUT THE ACTUAL NUMBER OF GROUPS (M) IN YOUR ANALYSIS.
(PROGRAM IS SET UP TO HANDLE VALUES OF M FROM 2 TO 50.)
M = ?6

INPUT DATA BY GROUP:  NUMBER OF SUCCESSES FOLLOWED BY A COMMA
AND THEN THE NUMBER OF OBSERVATIONS FOR THE GROUP.
NOTE:  KEEP TRACK OF GROUP NUMBER, SINCE THIS IS THE WAY GROUPS
WILL BE REFERRED TO IN SUBSEQUENT ANALYSES.

GROUP        X AND N
------------------
   1          ?10,15
   2          ?13,21
   3          ?5,16
   4          ?10,17
   5          ?6,15
   6          ?11,17

YOU HAVE NOW ENTERED DATA FOR ALL  6 GROUPS.

IF YOU WANT TO CONTINUE THE ANALYSIS      TYEP '1'
            TO REENTER  YOUR DATA         TYPE '0'

?1
```

POSTERIOR JOINT MODAL ESTIMATES

GROUP	X	N	X/N	ESTIMATE*
1	10	15	0.667	0.601
2	13	21	0.619	0.591
3	5	16	0.312	0.499
4	10	17	0.588	0.579
5	6	15	0.400	0.527
6	11	17	0.647	0.597

* THESE ESTIMATES ARE BASED ON THE JOINT MODE OF THE TRANSFORMED PI VALUES. (NOTE: THEY ARE NOT IDENTICAL TO THE JOINT MODE OF THE PI VALUES THEMSELVES.)

WHEN YOU WANT TO CONTINUE TYPE '1'.?1

BEFORE GOING ON, SOME LENGTHY COMPUTATIONS ARE REQUIRED. PLEASE BE PATIENT.

YOU MAY NOW OBTAIN INFORMATION ABOUT THE MARGINAL DISTRIBUTION OF PI FOR ANY GROUP. WHICH GROUP WOULD YOU LIKE TO CONSIDER FIRST?3

MORE LENGTHY COMPUTATIONS ARE REQUIRED TO OBTAIN THE MEAN OF THE MARGINAL POSTERIOR DISTRIBUTION FOR THIS GROUP.

				ESTIMATES	
GROUP	X	N	X/N	JOINT	MARGINAL*
3	5	16	0.312	0.499	0.466

* THIS ESTIMATE IS BASED ON THE MEAN OF THE TRANSFORMED PI VALUE. (NOTE: IT IS NOT IDENTICAL TO THE MEAN OF THE PI VALUE ITSELF.)

CADA CAN COMPUTE THE APPROXIMATE PERCENTILES , AND/OR APPROXIMATE PROBABILITIES THAT PI EXCEEDS VALUES.

```
IF YOU WANT TO SEE THESE PROBABILITIES      TYEP '1'
           TO SKIP THESE PART OF ANALYSIS   TYPE '2'
?1
```

MORE LENGTHY COMPUTATIONS ARE REQUIRED, THIS TIME TO OBTAIN THE STANDARD DEVIATION OF THE MARGINAL DISTRIBUTION FOR THIS GROUP WITH THE MEAN AND STANDARD DEVIATION EVALUATED. HOWEVER, THE APPROXIMATE PERCENTILES AND PROBABILITIES CAN BE CALCULATED VERY RAPIDLY.

HALFWAY THERE!

HERE ARE SOME APPROXIMATE PERCENTILES FOR THE POSTERIOR MARGINAL DISTRIBUTION OF PI FOR GROUP 3

X	N	X/N	10TH	25TH	50TH	75TH	90TH
5	16	0.312	0.353	0.406	0.466	0.527	0.581

IF YOU WANT THE PROBABILITIES THAT PI EXCEEDS CERTAIN
VALUES WHICH YOU SPECIFY (UP TO 5 AT A TIME)
TYPE THE NUMBER OF VALUES YOU WANT TO SPECIFY, NONE=0
?5

```
VALUE  1   ?.3
VALUE  2   ?.4
VALUE  3   ?.5
VALUE  4   ?.6
VALUE  5   ?.65
```

HERE IS THE APPROXIMATE PROBABILITY THAT PI FOR GROUP 3
EXCEEDS PI(0).

			VALUES OF PI(0)				
X	N	X/N	0.300	0.400	0.500	0.600	0.650
5	16	0.312	0.97	0.77	0.35	0.07	0.02

HOW MANY MORE VALUES DO YOU WANT TO SPECIFY (0-5) ?0

IF YOU WISH TO CONSIDER ANOTHER GROUP, TYPE ITS NUMBER
TO EXIT THE MODULE , TYPE '0'
?0

ARCSINE TRANSFORMATION

1. PRIOR DISTRIBUTION
2. POSTERIOR DISTRIBUTIONS (EQUAL GROUP SIZES)
3. POSTERIOR DISTRIBUTIONS (UNEQUAL GROUP SIZES)

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0

COMPONENT 41. SIMULTANEOUS ESTIMATION OF PROPORTIONS

1. ARCSINE TRANSFORMATION

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?0

COMPONENT GROUP 4. BAYESIAN SIMULTANEOUS ESIMATION

41. SIMULTANEOUS ESTIMATION OF PROPORTIONS
42. SIMULTANEOUS ESTIMATION OF MEANS
43. SIMULTANEOUS PREDICTION IN M GROUPS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?42

COMPONENT 42. SIMULTANEOUS ESTIMATION OF MEANS

1. EQUAL WITHIN-GROUP VARIANCES

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?1

EQUAL WITHIN-GROUP VARIANCES MODEL

1. PRIOR DISTRIBUTIONS
2. POSTERIOR DISTRIBUTIONS

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1

PRIOR DISTRIBUTION
FOR
SIMULTANEOUS ESTIMATION OF MEANS

THIS MODULE ASSUMES THAT YOU HAVE EXCHANGEABLE BELIEFS ABOUT THE GROUP MEANS. THE WITHIN GROUP VARIANCE IS ASSUMED EQUAL FOR ALL GROUPS.

THIS MODULE WILL ASSIST YOU IN FITTING DISTRIBUTIONS TO YOUR BELIEFS ABOUT

1. THE GRAND MEAN OR AVERAGE OF THE GROUP MEANS
2. THE MEAN OF A RANDOMLY SELECTED GROUP
3. A RANDOMLY SELECTED OBSERVATION FROM A GROUP WITH KNOWN MEAN

BY FITTING DISTRIBUTIONS TO YOUR BELIEFS ABOUT THESE VALUES IT IS POSSIBLE TO INFER YOUR PRIOR DISTRIBUTIONS ON THE

1. BETWEEN GROUP STANDARD DEVIATION
2. WITHIN GROUP STANDARD DEVIATION

WHEN YOU ARE READY TO CONTINUE   TYPE '1'.?1

PRIOR DISTRIBUTION ON THE GRAND MEAN

THE GRAND MEAN IS THE AVERAGE OF THE GROUP MEANS.

IT IS IMPORTANT THAT YOU KEEP IN MIND THAT YOU ARE BEING ASKED ABOUT THE GRAND MEAN, AND NOT THE GROUP MEANS.

WHAT IS YOUR BEST ESTIMATE OF THE GRAND MEAN?10

BEST ESTIMATE =   10.00

WHAT DO YOU THINK ARE REASONABLE LOWER AND UPPER BOUNDS ON THE VALUE OF THE GRAND MEAN?   REASONABLE MIGHT BE TAKEN TO MEAN THAT YOU THINK THERE IS ONLY 1 CHANCE IN 20 THAT THE THE GRAND MEAN IS LESS THAN THE LOWER BOUND, OR THAT IT IS GREATER THAN THE UPPER BOUND. REMEMBER IT IS THE GRAND MEAN WE ARE CONSIDERING.

WHAT IS YOUR LOWER BOUND?6

THE MODEL IMPLIES YOUR PRIOR BELIEFS ABOUT THE GRAND MEAN ARE SYMMETRIC ABOUT YOUR BEST ESTIMATE. THEREFORE BY THE SYMMETRY YOUR UPPER BOUND IS   14.00.

IF YOU ARE SATISFIED WITH THIS UPPER BOUND TYPE '1',ELSE '0'.?1

FOR EACH INTERVAL THAT APPEARS BELOW DECIDE IF YOU FEEL IT IS MORE LIKELY THAT THE GRAND MEAN IS INSIDE OR OUTSIDE OF IT.

RESPOND BY TYPING THE NUMBER OF THE APPROPRIATE OPTION.

OUTSIDE=1   INSIDE=2   CAN'T DECIDE=3

INTERVAL =	7.00	TO	13.00	RESPONSE	?1
INTERVAL =	6.50	TO	13.50	RESPONSE	?2
INTERVAL =	6.75	TO	13.25	RESPONSE	?3

HERE ARE SOME PERCENTILES OF FOUR DISTRIBUTIONS WHICH ARE CONSISTENT WITH WHAT YOU HAVE ALREADY TOLD US ABOUT YOUR PRIOR BELIEFS CONCERNING THE GRAND MEAN.

THESE DISTRIBUTIONS HAVE THE SAME 25TH, 50TH AND 75TH PERCENTILES BUT DIFFERENT EXTREME PERCENTILES.

25TH= 6.75 50TH= 10.00 75TH= 13.25

	5TH	10TH	90TH	95TH
1	0.65	3.27	16.73	19.35
2	1.20	3.48	16.52	18.80
3	1.44	3.57	16.43	18.56
4	1.67	3.66	16.34	18.33

YOU CAN EITHER TENTATIVELY ACCEPT ONE OF THESE DISTRIBUTIONS OR CHANGE YOUR BEST ESTIMATE AND BOUNDS AND REPEAT THE PROCEDURE YOU JUST COMPLETED.

REPEAT=0 OR NUMBER OF DISTRIBUTION ?3

PRIOR ON THE MEAN OF A RANDOMLY SELECTED GROUP

YOU HAVE TENTATIVELY ACCEPTED A PRIOR DISTRIBUTION ON THE AVERAGE OF THE GROUP MEANS OR THE GRAND MEAN. WE NOW WANT YOU TO CONSIDER THE MEAN OF A RANDOMLY SELECTED GROUP.

YOU ARE AGAIN REMINDED OF THE IMPORTANCE OF KEEPING CLEARLY IN MIND WHAT IT IS YOU ARE BEING ASKED ABOUT.

THE MODEL IMPLIES THAT YOUR BEST ESTIMATE OF THE MEAN OF A RANDOMLY SELECTED GROUP IS THE SAME AS YOUR BEST ESTIMATE OF THE GRAND MEAN.

YOUR BEST ESTIMATE OF THE GROUP MEAN IS 10.00.

WHAT DO YOU FEEL IS A REASONABLE LOWER BOUND ON THE MEAN OF THIS GROUP? AGAIN REASONABLE MAY BE TAKEN TO MEAN THAT YOU FEEL THERE IS ONLY 1 CHANCE IN 20 THAT THE MEAN IS LESS THAN THIS BOUND.

WHAT IS THE LOWER BOUND ON THF MEAN OF THIS GROUP.?4

```
BEST ESTIMATE =      10.00    LOWER BOUND =      4.00

THE MODEL ALSO IMPLIES SYMMETRY IN YOUR BELIEFS ABOUT THE
GROUP MEAN AND THEREFORE YOUR UPPER BOUND IS     16.00.


IF YOU ARE SATISFIED WITH THIS UPPER BOUND TYPE '1',ELSE '0'.?1
```

```
CONSIDER THE FOLLOWING INTERVALS AND DECIDE IF YOU THINK
IT IS MORE LIKELY THAT THE MEAN OF THE GROUP IS INSIDE OR
OUTSIDE EACH OF THE INTERVALS.

OUTSIDE=1     INSIDE=2   CAN'T DECIDE=3

INTERVAL =      5.37 TO      14.62       RESPONSE  ?1
INTERVAL =      4.69 TO      15.31       RESPONSE  ?1
INTERVAL =      4.34 TO      15.66       RESPONSE  ?1
INTERVAL =      4.17 TO      15.83       RESPONSE  ?3
```

HERE ARE SOME PERCENTILES OF A DISTRIBUTION FITTED TO BELIEFS ABOUT THE MEAN OF THE RANDOMLY SELECTED GROUP. THE DISTRIBUTION IS ALSO CONSISTENT WITH WHAT YOU HAVE TOLD US ABOUT THE GRAND MEAN.

5TH =	-5.34
10TH =	-1.52
25TH =	4.17
50TH =	10.00
75TH =	15.83
90TH =	21.52
95TH =	25.34

THE MEDIAN OF THE IMPLIED PRIOR DISTRIBUTION ON THE BETWEEN GROUP STANDARD DEVIATION = 6.46.

YOU CAN EITHER TENTATIVELY ACCEPT THIS DISTRIBUTION AS YOUR PRIOR DISTRIBUTION ON THE GROUP MEANS, OR REPEAT THE ASSESSMENT PROCEDURE AT THE GRAND MEAN OR GROUP MEAN LEVEL.

REPEAT GROUP MEAN=-1 REPEAT GRAND MEAN=0 OR ACCEPT=1 ?1

PRIOR ON A RANDOMLY SELECTED OBSERVATION FROM A GROUP

WE NOW WANT TO ASK YOU ABOUT YOUR BELIEFS CONCERNING THE VARIABILITY WITHIN A GROUP. ARE THE OBSERVATIONS IN A GROUP MUCH THE SAME OR ARE THEY QUITE DIFFERENT?

SUPPOSE A GROUP IS SELECTED AT RANDOM AND YOU ARE TOLD THAT THE MEAN OF THE GROUP IS 10.00.

WHAT DO YOU FEEL IS A REASONABLE LOWER BOUND FOR THE VALUE OF AN OBSERVATION SELECTED AT RANDOM FROM THIS GROUP.?1

CONSIDER THE FOLLOWING INTERVALS AND DECIDE IF YOU THINK IT MORE LIKEY THAT AN OBSERVATION SELECTED AT RANDOM FROM THIS GROUP WILL BE INSIDE OR OUTSIDE THE INTERVAL.

OUTSIDE=1   INSIDE=2   CAN'T DECIDE=3

INTERVAL =	3.25	TO	16.75	RESPONSE	?2
INTERVAL =	6.62	TO	13.37	RESPONSE	?1
INTERVAL =	4.94	TO	15.06	RESPONSE	?1
INTERVAL =	4.09	TO	15.91	RESPONSE	?1
INTERVAL =	3.67	TO	16.33	RESPONSE	?1
INTERVAL =	3.46	TO	16.54	RESPONSE	?3

HERE ARE SOME PERCENTILES OF FOUR DISTRIBUTIONS WHICH ARE CONSISTENT WITH WHAT YOU HAVE TOLD US ABOUT YOUR PRIOR BELIEFS ABOUT A RANDOMLY SAMPLED OBSERVATION FROM THE GROUP.

THESE DISTRIBUTIONS HAVE THE SAME 25TH, 50TH AND 75TH PERCENTILES BUT DIFFERENT EXTREME PERCENTILES.

25TH= 3.46   50TH= 10.00   75TH= 16.54

	5TH	10TH	90TH	95TH
1	-8.82	-3.54	23.54	28.82
2	-7.71	-3.12	23.12	27.71
3	-7.21	-2.93	22.93	27.21
4	-6.76	-2.75	22.75	26.76

YOU CAN EITHER TENTATIVELY ACCEPT ONE OF THESE DISTRIBUTIONS AS YOUR PRIOR DISTRIBUTION OR REPEAT THE ASSESSMENT PROCEDURE AT THE GRAND MEAN, GROUP MEAN OR WITHIN GROUP LEVEL.
MEAN, GROUP MEAN OR WITHIN GROUP.

GRAND MEAN=-2 GROUP MEAN=-1 WITHIN GROUP=0 OR DISTRIBUTION?4

```
HERE ARE SOME CHARACTERISTICS OF THE PRIOR DISTRIBUTIONS
FITTED TO YOUR BELIEFS ABOUT
     1. GRAND MEAN
     2. MEAN OF A RANDOMLY SELECTED GROUP
     3. A RANDOMLY SELECTED OBSERVATION FROM A GROUP WITH
        MEAN =      10.00
```

T DISTRIBUTIONS	GRAND MEAN	GROUP MEAN	OBSERVATION
DEGREES OF FREEDOM	8.00	8.00	12.00
MEAN	10.00	10.00	10.00
ST. DEVIATION	5.31	9.53	10.30
5TH	1.44	-5.34	-6.76
10TH	3.57	-1.52	-2.75
25TH	6.75	4.17	3.46
75TH	13.25	15.83	16.54
90TH	16.43	21.52	22.75
95TH	18.56	25.34	26.76

```
IF YOU WANT TO DO THE POSTERIOR ANALYSIS TYPE '1', ELSE '0'.?1




    POSTERIOR ANALYSIS  -  SIMULTANEOUS ESTIMATION OF MEANS

THIS MODULE OBTAINS POSTERIOR DISTRIBUTIONS FOR THE MEANS OF
M (MAX=12) DIFFERENT GROUPS UNDER THE ASSUMPTION THAT  YOUR
PRIOR BELIEFS ABOUT THE MEANS ARE EXCHANGEABLE.

HOW MANY GROUPS ARE THERE IN YOUR DATA SET ?8
```

```
ENTER THE SAMPLE DATA:
     1. NUMBER OF OBSERVATIONS (N)
     2. SAMPLE MEAN (X.)
     3. STANDARD DEVIATION (DIVISOR N)

GROUP      N,     X.,    ST.DEV.
--------------------------------------------
    1   ?5,11.34,1.04
    2   ?5,9.11,0.59
    3   ?5,10.9,1.15
    4   ?5,10.12,1.21
    5   ?5,10.70,0.47
    6   ?5,9.25,0.83
    7   ?5,10.66,1.45
    8   ?5,10.86,0.52
```

```
HERE ARE THE SAMPLE DATA YOU ENTERED.

GROUP          N          X.        ST.DEV.
   1           5        11.34          1.04
   2           5         9.11          0.59
   3           5        10.90          1.15
   4           5        10.12          1.21
   5           5        10.70          0.47
   6           5         9.25          0.83
   7           5        10.66          1.45
   8           5        10.86          0.52

IF THE DATA ARE CORRECT TYPE '1', ELSE '0'.?1

TOTAL SAMPLE SIZE = 40

SOME LENGTHY COMPUTATIONS ARE REQUIRED.   PLEASE BE PATIENT.
```

HERE ARE THE MEANS OF THE POSTERIOR MARGINAL DISTRIBUTIONS ON THE
THE GROUP MEANS.

GROUP	N	SAMPLE MEAN	MEAN OF POSTERIOR
1	5	11.34	11.17
2	5	9.11	9.30
3	5	10.90	10.80
4	5	10.12	10.15
5	5	10.70	10.63
6	5	9.25	9.42
7	5	10.66	10.60
8	5	10.86	10.77

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
1. POSTERIOR MARGINAL PROBABILITIES FOR THE GROUP MEANS
2. POSTERIOR PROBABILITIES FOR LINEAR COMBINATIONS OF GROUP MEANS
3. EXIT THE MODULE

?1

POSTERIOR PROBABILITIES FOR MEANS

GROUP	SAMPLE MEAN	MEAN OF POSTERIOR MARGINAL
1	11.34	11.17
2	9.11	9.30
3	10.90	10.80
4	10.12	10.15
5	10.70	10.63
6	9.25	9.42
7	10.66	10.60
8	10.86	10.77

POSTERIOR PROBABILITY THAT GROUP MEAN IS LESS THAN X.

```
INPUT THE GROUP NUMBER (EXIT=0).?3
INPUT X (EXIT=-7777)?10
                          PROB(MEAN <    10.00) = 0.35
INPUT X (EXIT=-7777)?10.9
                          PROB(MEAN <    10.90) = 0.52
INPUT X (EXIT=-7777)? 7777

INPUT THE GROUP NUMBER (EXIT=0).?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. POSTERIOR MARGINAL PROBABILITIES FOR THE GROUP MEANS
     2. POSTERIOR PROBABILITIES FOR LINEAR COMBINATIONS OF
        GROUP MEANS
     3. EXIT THE MODULE
?2
```

POSTERIOR PROBABILITIES FOR LINEAR COMBINATIONS OF GROUP MEANS

GROUP	SAMPLE MEAN	MEAN OF POSTERIOR MARGINAL
1	11.34	11.17
2	9.11	9.30
3	10.90	10.80
4	10.12	10.15
5	10.70	10.63
6	9.25	9.42
7	10.66	10.60
8	10.86	10.77

INPUT THE NUMBER OF GROUPS IN THE LINEAR COMBINATION (EXIT=0)?8

INPUT GROUP NUMBER AND COEFFICIENT FOR THAT GROUP.

```
GROUP NUMBER,COEFFICIENT ?1, -7
GROUP NUMBER,COEFFICIENT ?2,1
GROUP NUMBER,COEFFICIENT ?3,1
GROUP NUMBER,COEFFICIENT ?4,1
GROUP NUMBER,COEFFICIENT ?5,1
GROUP NUMBER,COEFFICIENT ?6,1
GROUP NUMBER,COEFFICIENT ?7,1
GROUP NUMBER,COEFFICIENT ?8,1
```

HERE IS THE LINEAR COMBINATION YOU ARE EXAMINING.

GROUP	COEFFICIENT	MEAN
1	-7.00	11.17
2	1.00	9.30
3	1.00	10.80
4	1.00	10.15
5	1.00	10.63
6	1.00	9.42
7	1.00	10.60
8	1.00	10.77

MODULE WILL GIVE PROBABILITY LESS THAN SOME VALUE X.

```
INPUT X (EXIT=-7777)?0
                                PROB( L.C. <     0.00 ) =0.67
INPUT X (EXIT=-7777)? 7777
```

```
GROUP      SAMPLE MEAN      MEAN OF POSTERIOR MARGINAL
  1           11.34                   11.17
  2            9.11                    9.30
  3           10.90                   10.80
  4           10.12                   10.15
  5           10.70                   10.63
  6            9.25                    9.42
  7           10.66                   10.60
  8           10.86                   10.77

INPUT THE NUMBER OF GROUPS IN THE LINEAR COMBINATION (EXIT=0)?2

INPUT GROUP NUMBER AND COEFFICIENT FOR THAT GROUP.

GROUP NUMBER,COEFFICIENT ?2,1
GROUP NUMBER,COEFFICIENT ?6,-1
```

```
HERE IS THE LINEAR COMBINATION YOU ARE EXAMINING.

GROUP       COEFFICIENT        MEAN
  2            1.00            9.30
  6           -1.00            9.42

MODULE WILL GIVE PROBABILITY LESS THAN SOME VALUE X.

INPUT X (EXIT=-7777)?0
                             PROB( L.C. <      0.00 ) =0.52
INPUT X (EXIT=-7777)? 7777
```

GROUP	SAMPLF MEAN	MEAN OF POSTERIOR MARGINAL
1	11.34	11.17
2	9.11	9.30
3	10.90	10.80
4	10.12	10.15
5	10.70	10.63
6	9.25	9.42
7	10.66	10.60
8	10.86	10.77

INPUT THE NUMBER OF GROUPS IN THE LINEAR COMBINATION (EXIT=0)?0

TYPE THE NUMBER OF THE OPTION YOU WANT.

1. POSTERIOR MARGINAL PROBABILITIES FOR THE GROUP MEANS
2. POSTERIOR PROBABILITIES FOR LINEAR COMBINATIONS OF GROUP MEANS
3. EXIT THE MODULE

?3

EQUAL WITHIN-GROUP VARIANCES MODEL

1. PRIOR DISTRIBUTIONS
2. POSTERIOR DISTRIBUTIONS

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0

COMPONENT 42. SIMULTANEOUS ESTIMATION OF MEANS

1. EQUAL WITHIN-GROUP VARIANCES

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?0

COMPONENT GROUP 4. BAYESIAN SIMULTANEOUS ESIMATION

```
41.  SIMULTANEOUS ESTIMATION OF PROPORTIONS
42.  SIMULTANEOUS ESTIMATION OF MEANS
43.  SIMULTANEOUS PREDICTION IN M GROUPS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?0
```

COMPONENT GROUPS

```
1.   DATA MANAGEMENT FACILITY
2.   SIMPLE BAYESIAN PARAMETRIC MODELS
3.   DECISION THEORETIC MODELS
4.   BAYESIAN SIMULTANEOUS ESTIMATION
5.   BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.   BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.   ELEMENTARY CLASSICAL STATISTICS
8.   EXPLORATORY DATA ANALYSIS
9.   PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?1
```

```
COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12.  DATA MOVEMENT      ( INPUT/OUTPUT, EDITING )
13.  DATA TRANSFORMATIONS
14.  FILE MAINTENANCE  ( DATA GROUPING )

   * NOT YET AVAILABLE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?12
```

```
     COMPONENT 12.  DATA MOVEMENT

     1.  DATA ENTRY AND TRANSFERS
     2.  DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER ( ELSE '0' )?1
```

MODEL 1. DATA ENTRY AND TRANSFERS

1. DATA ENTRY FROM THE TERMINAL
2. DATA TRANSFER FROM DISK
3. DATA TRANSFER FROM THE CATALOG

4. DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0')?3

THE DATA FILE CATALOG

1. ITBS SCORES, SCHOOL #1
2. ITBS SCORES, SCHOOL #14
3. ESAA PILOT PROGRAM
4. IOWA COUNTY DATA
5. SAMPLE REGRESSION DATA
6. SAMPLE ANOVA DATA
7. SAMPLE MANOVA DATA
8. JUNIOR COLLEGE ACT SCORES

IF YOU WANT AN AVAILABLE DATA SET, TYPE ITS NUMBER (ELSE '0').?5

TO TRANSFER THESE DATA TO YOUR WORK FILE, TYPE '1'.
TO OBTAIN A DESCRIPTION OF THESE DATA, TYPE '2'.?1

```
THE DATA SET IS NOW IN THE PERSONAL FILE.  IT WILL REMAIN THERE
UNTIL YOU SIGN OFF THE MONITOR OR REPLACE IT WITH ANOTHER DATA
SET.

IF YOU WISH TO PROCEED TO AN ANALYSIS,     TYPE '1'.
IF YOU WISH TO REMAIN IN DATA MANAGEMENT, TYPE '2'.?1
```

```
     COMPONENT GROUPS

1.   DATA MANAGEMENT FACILITY
2.   SIMPLE BAYESIAN PARAMETRIC MODELS
3.   DECISION THEORETIC MODELS
4.   BAYESIAN SIMULTANEOUS ESTIMATION
5.   BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.   BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.   ELEMENTARY CLASSICAL STATISTICS
8.   EXPLORATORY DATA ANALYSIS
9.   PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?4
```

COMPONENT GROUP 4. BAYESIAN SIMULTANEOUS ESIMATION

41. SIMULTANEOUS ESTIMATION OF PROPORTIONS
42. SIMULTANEOUS ESTIMATION OF MEANS
43. SIMULTANEOUS PREDICTION IN M GROUPS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?43

COMPONENT 43. SIMULTANEOUS PREDICTION IN M GROUPS

1. EQUAL-SLOPES MODEL

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?1

EQUAL-SLOPES MODEL

1. LEAST-SQUARES AND BAYESIAN ESTIMATES

IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?1

SIMULTANEOUS ESTIMATION - EQUAL SLOPES

IF YOU WANT AN EXPLANATION, TYPE '2' (ELSE '1')?2

SIMULTANEOUS ESTIMATION - EQUAL SLOPES

```
THIS MODULE ALLOWS THE USER TO OBTAIN MODAL ESTIMATES FOR
THE PARAMETERS OF A SIMPLIFIED M-GROUP REGRESSION MODEL

THIS MODEL MAKES USE OF THE FOLLOWING TWO ASSUMPTIONS.

ASSUMPTION 1.  EACH GROUP IS EXCHANGEABLE WITH ANY OTHER GROUP.
               THAT IS, THE PRIOR DISTRIBUTIONS FOR THE
               REGRESSION PARAMETERS OF THE M GROUPS SHOULD
               BE UNALTERED BY ANY PERMUTATION OF THE GROUP
               SUBSCRIPTS.

ASSUMPTION 2.  THE VARIANCES ACROSS GROUPS OF THE REGRESSION
               COEFFICIENTS ARE ZERO(EXCEPT FOR THE INTERCEPTS).
               THAT IS, THE SLOPES OF THE REGRESSION LINES FOR
               EACH GROUP ARE EQUAL.

NOTE:  THESE MAY BE QUITE STRINGENT ASSUMPTIONS AND WILL NOT HOLD
       FOR ALL ANALYSES.

TO CONTINUE, TYPE '1'  ( ELSE '0' )?1




            DATA SET --COLDAT

 10     GROUPS
GROUP 1      --COLL6
GROUP 2      --COLL7
GROUP 3      --COLL8
GROUP 4      --COLL9
GROUP 5      --COLL10
GROUP 6      --COLL11
GROUP 7      --COLL12
GROUP 8      --COLL13
GROUP 9      --COLL15
GROUP 10     --COLL19

 4    VARIABLES
VARIABLE 1     --ENGLSH
VARIABLE 2     -- MATH
VARIABLE 3     --NATSCI
VARIABLE 4     -- GPA

TYPE THE NUMBER OF THE CRITERION VARIABLE.?4
IF YOU WANT ENGLSH AS A PREDICTOR,TYPE '1' ELSE TYPE '0'?1
IF YOU WANT  MATH  AS A PREDICTOR,TYPE '1' ELSE TYPE '0'?1
IF YOU WANT NATSCI AS A PREDICTOR,TYPE '1' ELSE TYPE '0'?0
```

COMPUTING LEAST SQUARES ESTIMATES

LEAST SQUARE ESTIMATES

STANDARD DEVIATION OF RESIDUALS IS .630538

GROUP	INTERCEPT AT GRAND MEAN
1	2.05
2	2.05
3	1.95
4	2.19
5	2.46
6	2.51
7	2.72
8	2.27
9	1.92
10	2.76

	REGRESSION COEFFICIENTS(SLOPES)
ENGLSH	0.051
MATH	0.035

ENTER YOUR BEST ESTIMATE FOR THE STANDARD DEVIATION OF THE INTERCEPTS AT THE GRAND MEAN.?.7

BAYESIAN ESTIMATES

STANDARD DEVIATION OF RESIDUALS IS .615813

GROUP	INTERCEPT AT GRAND MEAN
1	2.07
2	2.07
3	1.98
4	2.20
5	2.45
6	2.50
7	2.69
8	2.27
9	1.95
10	2.72

	REGRESSION COEFFICIENTS(SLOPES)
ENGLSH	0.051
MATH	0.034

ENTER ANOTHER ESTIMATE FOR THE STANDARD DEVIATION OF THE
THE INTERCEPTS AT THE GRAND MEAN (EXIT=0)?0

PREDICTED VALUES FOR SIMULTANEOUS ESTIMATION

THE MODULE WILL COMPUTE THE PREDICTED VALUES AND PROBABILITIES ASSESSMENTS FOR EACH GROUP FOR A GIVEN SET OF THE PREDICTOR SCORES.

ENTER THE VALUE OF PREDICTORS

ENGLSH=?10
MATH =?20

```
ENGLSH=  10.00   MATH =  20.00

GROUP                  PREDICTED Y

   1                      1.74
   2                      1.74
   3                      1.65
   4                      1.86
   5                      2.12
   6                      2.17
   7                      2.36
   8                      1.94
   9                      1.62
  10                      2.39

INPUT A VALUE YO FOR WHICH YOU WISH TO SEE THE PROBABILITY
FOR EACH GROUP THAT Y IS GREATER THAN YO. FOR THE PREDICTORS
ENGLSH=  10.00   MATH =  20.00
?2.5




ENGLSH=  10.00   MATH =  20.00

GROUP            PROBABILITY Y> 2.5
   1                  0.47
   2                  0.47
   3                  0.46
   4                  0.47
   5                  0.48
   6                  0.49
   7                  0.49
   8                  0.48
   9                  0.46
  10                  0.50

ENTER A NEW Y VALUE OR TYPE '-7777' TO EXIT ? -7777

IF YOU WANT TO ENTER ANOTHER SET OF PREDICTORS TYPE '1'
            TO EXIT THE MODEL                   TYPE '0'
?1
```

```
ENTER THE VALUE OF PREDICTORS

ENGLSH=?30
 MATH =?20
```

```
ENGLSH=  30.00    MATH =  20.00

GROUP                 PREDICTED Y

   1                      2.76
   2                      2.77
   3                      2.67
   4                      2.89
   5                      3.14
   6                      3.19
   7                      3.38
   8                      2.96
   9                      2.64
  10                      3.42

INPUT A VALUE Y0 FOR WHICH YOU WISH TO SEE THE PROBABILITY
FOR EACH GROUP THAT Y IS GREATER THAN Y0. FOR THE PREDICTORS
ENGLSH=  30.00    MATH =  20.00
?2.5
```

```
ENGLSH=  30.00   MATH =  20.00

GROUP            PROBABILITY Y> 2.5
   1                     0.51
   2                     0.51
   3                     0.50
   4                     0.51
   5                     0.52
   6                     0.52
   7                     0.52
   8                     0.51
   9                     0.50
  10                     0.52

ENTER A NEW Y VALUE OR TYPE '-7777' TO EXIT ?-7777

IF YOU WANT TO ENTER ANOTHER SET OF PREDICTORS TYPE '1'
            TO EXIT THE MODEL                  TYPE '0'
?0




         EQUAL-SLOPES MODEL

       1. LEAST-SQUARES AND BAYESIAN ESTIMATES


IF YOU WANT AN AVAILABLE MODULE TYPE ITS NUMBER, ELSE '0'.?0
```

COMPONENT 43. SIMULTANEOUS PREDICTION IN M GROUPS

1. EQUAL-SLOPES MODEL

IF YOU WANT AN AVAILABLE MODEL TYPE ITS NUMBER ELSE '0'.?0

COMPONENT GROUP 4. BAYESIAN SIMULTANEOUS ESIMATION

41. SIMULTANEOUS ESTIMATION OF PROPORTIONS
42. SIMULTANEOUS ESTIMATION OF MEANS
43. SIMULTANEOUS PREDICTION IN M GROUPS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?0

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?

Component Group 5

```
     COMPONENT GROUPS

1.   DATA MANAGEMENT FACILITY
2.   SIMPLE BAYESIAN PARAMETRIC MODELS
3.   DECISION THEORETIC MODELS
4.   BAYESIAN SIMULTANEOUS ESTIMATION
5.   BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.   BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.   ELEMENTARY CLASSICAL STATISTICS
8.   EXPLORATORY DATA ANALYSIS
9.   PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?1
```

```
COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12.  DATA MOVEMENT     ( INPUT/OUTPUT, EDITING )
13.  DATA TRANSFORMATIONS
14.  FILE MAINTENANCE  ( DATA GROUPING )

    * NOT YET AVAILABLE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?12
```

COMPONENT 12. DATA MOVEMENT

1. DATA ENTRY AND TRANSFERS
2. DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0')?1

MODEL 1. DATA ENTRY AND TRANSFERS

1. DATA ENTRY FROM THE TERMINAL
2. DATA TRANSFER FROM DISK
3. DATA TRANSFER FROM THE CATALOG

4. DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0')?3

```
THE DATA FILE CATALOG

    1. ITBS SCORES, SCHOOL #1
    2. ITBS SCORES, SCHOOL #14
    3. ESAA PILOT PROGRAM
    4. IOWA COUNTY DATA
    5. SAMPLE REGRESSION DATA
    6. SAMPLE ANOVA DATA
    7. SAMPLE MANOVA DATA
    8. JUNIOR COLLEGE ACT SCORES

IF YOU WANT AN AVAILABLE DATA SET, TYPE ITS NUMBER ( ELSE '0' ).?6

TO TRANSFER THESE DATA TO YOUR WORK FILE, TYPE '1'.
TO OBTAIN A DESCRIPTION OF THESE DATA,    TYPE '2'.?2
```

```
DATA SET #6 :  SAMPLE ANOVA DATA

THESE DATA ARE TAKEN FROM A PROBLEM ON PAGE 96 OF THE BOOK
'STATISTICS AND EXPERIMENTAL DESIGN IN ENGINEERING AND THE
PHYSICAL SCIENCES' BY N.L.JOHNSON AND F.C.LEONE.

'FOUR TYPES OF ADHESIVES ARE TESTED FOR BOND STRENGTH.
A TOTAL OF 48 SPECIMENS ARE PREPARED. A SECOND FACTOR
WAS TESTED WITHIN THE EXPERIMENT, NAMELY CURING PRESSURE.
THE PRESSURES WERE 100 PSI (POUNDS PER SQUARE INCH), 200 PSI
AND 300 PSI.' (THE ADHESIVES ARE CALLED '031', '026', '047'
AND 'OOT'.)

TO CONTINUE,                                  TYPE '1'.?1
```

```
THUS, THE DATA ELEMENTS IN THIS DATA SET ARE :

THE TWO FACTORS IN THE DESIGN :

   ADHESV :  TYPE OF ADHESIVE, 1=031, 2=026, 3=047, 4=00T,
   PRESUR :  CURING PRESSURE,  1=100PSI, 2=200PSI, 3=300PSI,

AND THE DEPENDENT VARIABLE :

   STRNTH :  BOND STRENGTH.

IF YOU WANT TO USE THIS DATA SET, TYPE '1' ( ELSE '0' ).?1
```

```
THE DATA SET IS NOW IN THE PERSONAL FILE.  IT WILL REMAIN THERE
UNTIL YOU SIGN OFF THE MONITOR OR REPLACE IT WITH ANOTHER DATA
SET.

IF YOU WISH TO PROCEED TO AN ANALYSIS,     TYPE '1'.
IF YOU WISH TO REMAIN IN DATA MANAGEMENT, TYPE '2'.?1
```

```
     COMPONENT GROUPS

1.   DATA MANAGEMENT FACILITY
2.   SIMPLE BAYESIAN PARAMETRIC MODELS
3.   DECISION THEORETIC MODELS
4.   BAYESIAN SIMULTANEOUS ESTIMATION
5.   BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.   BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.   ELEMENTARY CLASSICAL STATISTICS
8.   EXPLORATORY DATA ANALYSIS
9.   PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?5
```

```
COMPONENT GROUP 5.  BAYESIAN FULL-RANK ANALYSIS OF VARIANCE

51.  FULL-RANK MODEL I FACTORIAL ANALYSIS OF VARIANCE
52.  BAYESIAN ANALYSIS OF REPEATED-MEASURES DESIGNS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?51
```

COMPONENT 51

FULL-RANK MODEL I FACTORIAL ANALYSIS OF VARIANCE

THIS COMPONENT CARRIES OUT A BAYESIAN ANALYSIS OF VARIANCE BASED ON A NON-INFORMATIVE PRIOR DISTRIBUTION. IT ASSUMES THAT ALL FACTORS IN THE EXPERIMENTAL DESIGN ARE FIXED.

THERE CAN BE UP TO 4 FACTORS IN THE EXPERMENT AND 32 CELLS. THERE NEED NOT BE EQUAL NUMBERS OF CASES IN EACH CELL BUT EMPTY CELLS ARE NOT ALLOWED.

THE FIRST MODEL OF THIS COMPONENT SETS UP A FILE OF SUMMARY STATISTICS FOR ANALYSIS -- IT WILL ACCEPT RAW OR SUMMARY DATA.

```
     TO SET UP A FILE OF SUMMARY STATISTICS         TYPE 1
     TO COMPUTE MAIN EFFECTS AND INTERACTIONS       TYPE 2
     TO ANALYZE THEIR POSTERIOR DISTRIBUTION        TYPE 3
     TO EXIT                                        TYPE 0
?1
```

SUMMARY STATISTICS

THIS PROGRAM ASSEMBLES SUMMARY STATISTICS AND PLACES THEM ON FILE FOR FURTHER ANALYSIS.

```
     TO CONTINUE                                TYPE 1
     FOR MORE DETAILS                           TYPE 2
?1
```

```
DATA IS ACCEPTED IN SEVERAL FORMS -- RAW OR SUMMARIZED,

IF SUMMARY STATISTICS ARE TO BE PREPARED FROM DATA ON FILE
THIS PROGRAM EXPECTS THE VARIABLES REPRESENTING LEVELS OF
THE FACTORS TO BE CODED AS SUCCESSIVE INTEGERS STARTING
FROM 1.  FOR EXAMPLE, IF ONE FACTOR IS 'ILLUMINATION' AND
HAS 3 LEVELS CALLED '30 LUMENS', '60 LUMENS' AND
'90 LUMENS', THEN THESE MUST BE CODED 1,2 AND 3, NOT 30
60 AND 90.

     TO CONTINUE                                        TYPE 1
?1
```

```
WARNING !          WARNING !        WARNING !

YOU HAVE A COPY OF A DATA SET CALLED 'JONLEO' ON YOUR PERSONAL
FILE.  THIS COPY WILL BE REPLACED BY A SET OF SUMMARY DATA.
THIS MEANS THAT IF AFTER FINISHING THIS ANALYSIS YOU WANT TO
RE-ANALYZE JONLEO WITH ANOTHER CADA COMPONENT YOU WILL HAVE
TO RE-TYPE THE DATA AT THE TERMINAL OR TRANSFER A COPY FROM
A PERMANENT FILE.

IF YOU WANT TO PLACE A COPY OF 'JONLEO' ON A PERMANENT FILE YOU
MUST EXIT THIS COMPONENT GROUP, SELECT THE DATA MANAGEMENT
COMPONENT GROUP AND FOLLOW ITS DIRECTIONS FOR COPYING DATA TO
A PERMANENT (DISK) FILE.

    TO CONTINUE                                         TYPE 1
    TO EXIT                                             TYPE 0?1
```

SUMMARY STATISTICS

THIS PROGRAM ASSEMBLES SUMMARY STATISTICS AND PLACES THEM ON FILE FOR FURTHER ANALYSIS.

```
     TO CONTINUE                                  TYPE 1
     FOR MORE DETAILS                             TYPE 2
?2
```

FOR EACH CELL IN THE DESIGN, THE NUMBER OF RESPONSES ,THE AVERAGE RESPONSE, AND A MEASURE OF THEIR 'SPREAD' IS CALCULATED. THE SPREAD IS THE SUM OF SQUARED DEVIATIONS AROUND THE CELL AVERAGE.

SUPPOSE, FOR EXAMPLE THAT YOUR EXPERIMENTAL DESIGN HAS TWO FACTORS CALLED A AND B AND THAT EACH FACTOR HAS THREE LEVELS. THE LEVELS OF FACTOR A ARE LABELLED A1, A2 AND A3 AND THE LEVELS OF FACTOR B ARE LABELLED B1,B2 AND B3.

THIS PROGRAM WOULD GROUP YOUR DATA INTO THE 9 'CELLS' DETERMINED BY THE FACTORS. THUS, CELL A1B2 WOULD CONTAIN ALL RESPONSES AT LEVEL A1 OF FACTOR A AND LEVEL B2 OF FACTOR B.

THE AVERAGE OF THE DATA IN CELL A1B1 WOULD BE CALCULATED THEN THE SUM OF SQUARED DEVIATIONS FROM THAT AVERAGE. THIS WOULD BE DONE FOR ALL CELLS, SO THAT THE SUMMAY DATA FILE WOULD CONTAIN 9 CELL COUNTS, 9 CELL AVERAGES AND 9 'SPREADS'.

```
     TO CONTINUE                                  TYPE 1?1
```

DATA IS ACCEPTED IN SEVERAL FORMS -- RAW OR SUMMARIZED,

IF SUMMARY STATISTICS ARE TO BE PREPARED FROM DATA ON FILE THIS PROGRAM EXPECTS THE VARIABLES REPRESENTING LEVELS OF THE FACTORS TO BE CODED AS SUCCESSIVE INTEGERS STARTING FROM 1. FOR EXAMPLE, IF ONE FACTOR IS 'ILLUMINATION' AND HAS 3 LEVELS CALLED '30 LUMENS', '60 LUMENS' AND '90 LUMENS', THEN THESE MUST BE CODED 1,2 AND 3, NOT 30 60 AND 90.

TO CONTINUE TYPE 1
?1

WARNING ! WARNING ! WARNING !

YOU HAVE A COPY OF A DATA SET CALLED 'JONLEO' ON YOUR PERSONAL FILE. THIS COPY WILL BE REPLACED BY A SET OF SUMMARY DATA. THIS MEANS THAT IF AFTER FINISHING THIS ANALYSIS YOU WANT TO RE-ANALYZE JONLEO WITH ANOTHER CADA COMPONENT YOU WILL HAVE TO RE-TYPE THE DATA AT THE TERMINAL OR TRANSFER A COPY FROM A PERMANENT FILE.

IF YOU WANT TO PLACE A COPY OF 'JONLEO' ON A PERMANENT FILE YOU MUST EXIT THIS COMPONENT GROUP, SELECT THE DATA MANAGEMENT COMPONENT GROUP AND FOLLOW ITS DIRECTIONS FOR COPYING DATA TO A PERMANENT (DISK) FILE.

TO CONTINUE TYPE 1
TO EXIT TYPE 0?1

```
WHAT IS THE FORM OF YOUR DATA?

   SUMMARY STATISTICS ON THE PERSONAL FILE          TYPE 1
   RAW DATA ON THE PERSONAL FILE                    TYPE 2
   SUMMARY STATISTICS ON PAPER                      TYPE 3
   RAW ON PAPER, RAW OR SUMMARY ON DISK OR TAPE     TYPE 4
?2
```

```
YOU HAVE REQUESTED A FILE NAMED JONLEO WHICH CONTIANS
DATA ON  48    INDIVIDUAL CASES

THE FOLLOWING VARIABLES WERE RECORDED FOR EACH CASE:

1. ADHESV   2. PRESUR   3. STRNTH

TYPE IN THE IDENTIFICATION # OF THE DEPENDENT VARIABLE.
?3

PLEASE TYPE IN THE ID#'S OF THE VARIABLES WHICH
ARE FACTORS IN YOUR DESIGN.  YOU NEED NOT INCLUDE
ALL THE VARIABLES LISTED ABOVE.

TYPE 0 TO END THE LIST OF FACTORS.

FACTOR # 1     IS VARIABLE #?1
FACTOR # 2     IS VARIABLE #?2
```

PROCESSING DATA...PLEASE STAND BY...

TO CONTINUE TYPE 1?1

THE DESIGN FACTORS AND THEIR LEVELS ARE:

ID#	FACTOR NAME	IDENTIFYING LETTER	NUMBER OF LEVELS
1	ADHESV	A	4
2	PRESUR	B	3

TO CONTINUE TYPE 1?1

...COMPUTING CELL MEANS AND DISPERSIONS...

TO CONTINUE TYPE 1?1

431

HERE ARE THE SUMMARY STATISTICS FOR EACH CELL:
N'S, MEANS AND STANDARD DEVIATIONS (DIVISOR=N).

#	CELL	N	MEAN	STD. DEV.
1	A1B1	4	+14.7500	+1.29904
2	A1B2	4	+14.5000	+3.20156
3	A1B3	4	+11.2500	+1.29904
4	A2B1	4	+18.2500	+7.11952
5	A2B2	4	+13.0000	+2.54951
6	A2B3	4	+12.7500	+4.20565
7	A3B1	4	+19.2500	+4.26468
8	A3B2	4	+21.2500	+4.32290
9	A3B3	4	+15.5000	+5.89491
10	A4B1	4	+6.75000	+2.48747
11	A4B2	4	+17.2500	+4.32290
12	A4B3	4	+16.2500	+4.32290

RECORD ANY INFORMATION YOU WANT TO REMEMBER.

TO CONTINUE TYPE 171

```
CADA WILL NOW REPLACE ANY DATA NOW ON YOUR PERSONAL FILE
WITH A 'BREAKDOWN' DATA SET CONSISTING OF N'S MEANS AND
SUMS OF SQUARES FOR EACH CELL OF YOUR DESIGN. AT THE END
OF THIS ANOVA YOU MAY IF YOU WISH TRANSFER THIS DATA SET
TO A PERMANENT DISK FILE FOR FUTURE ANALYSIS BY THIS ANOVA
COMPONENT.

PLEASE TYPE IN A 3-CHARACTER NAME FOR THIS DATA SET.
CADA WILL THEN ADD '$BD' TO THE END OF THE NAME TO IDENTIFY
IT AS A BREAKDOWN.

DATA SET NAME IS?JL




                COMPONENT 51

   FULL-RANK MODEL I FACTORIAL ANALYSIS OF VARIANCE


     TO SET UP A FILE OF SUMMARY STATISTICS       TYPE 1
     TO COMPUTE MAIN EFFECTS AND INTERACTIONS     TYPE 2
     TO ANALYZE THEIR POSTERIOR DISTRIBUTION      TYPE 3
     TO EXIT                                      TYPE 0
?2
```

YOU MUST NOW TELL CADA HOW YOU WANT TO DEFINE
THE MAIN EFFECTS OF EACH FACTOR. IF YOU HAVE NO
PREFERENCE, CADA WILL DEFINE THE EFFECTS FOR YOU.
HOWEVER, IF YOU WANT TO DEFINE THE MAIN EFFECTS
YOU MAY DO SO BY TYPING IN SETS OF CONTRASTS.

CADA CREATES MAIN EFFECTS BY TAKING DIFFERENCES OF
MEAN RESPONSES UNDER SUCCESSIVE LEVELS OF A FACTOR.
FOR EXAMPLE, IF FACTOR A HAS 3 LEVELS, AND THE MEAN
RESPONSES AT THESE LEVELS ARE DENOTED M:A1, M:A2 AND M:A3,
THEN THE TWO MAIN EFFECTS OF FACTOR A ARE (M:A2 - M:A1)
AND (M:A3 - M:A2).

```
     TO CONTINUE                              TYPE 1
     FOR MORE DETAILS                         TYPE 2
?2
```

MAIN EFFECTS -- COMBINATIONS OF CELL MEANS

SUPPOSE THAT THERE ARE THREE FACTORS IN YOUR DESIGN CALLED
A, B AND C EACH OF WHICH IS PRESENTED AT 3 LEVELS. THE
LEVELS OF FACTOR A ARE LABELLED A1, A2 AND A3. LEVELS OF
FACTOR B ARE LABELLED B1, B2 AND B3 AND THE LEVELS OF C
HAVE LABELS C1, C2 AND C3.

THERE ARE 27 COMBINATIONS OF LEVELS OF THE THREE FACTORS.
THESE ARE CALLED 'CELLS' IN THE DESIGN. FOR EXAMPLE A1B3C2
IS THE CELL CONTAINING THE RESPONSES (DEPENDENT VARIABLE
VALUES) OF ALL SUBJECTS EXPOSED TO THE COMBINATION OF LEVEL
1 OF FACTOR A, LEVEL 3 OF FACTOR B AND LEVEL 2 OF FACTOR C.

THE MEAN OF ALL RESPONSES IN CELL A1B3C2 IS LABELLED
M:A1B3C2 AND OTHER CELL MEANS HAVE SIMILAR LABELS. OTHER
SUMMARIES ARE COMPUTED AS MEANS OF MEANS. FOR EXAMPLE,
M:B2C1 IS THE AVERAGE OF M:A1B2C1, M:A2B2C1 AND M:A3B2C1
AND M:B1 IS THE AVERAGE OF NINE MEANS OF THE FORM M:AIB1CK.

```
     TO CONTINUE                              TYPE 1?1
```

MAIN EFFECTS CREATED BY CADA

WHEN YOU ELECT TO HAVE CADA CREATE THE MAIN EFFECTS, IT SELECTS DIFFERENCES AMONG MEAN RESPONSES TO ADJACENT LEVELS OF THE FACTORS. A THREE-LEVEL FACTOR LIKE B WILL HAVE TWO MAIN EFFECTS LABELLED E:B1 AND E:B2 AS FOLLOWS,

E:B1 = M:B2 - M:B1

AND

E:B2 = M:B3 - M:B2 .

IN OTHER WORDS, THE DIFFERENCE BETWEEN THE MEAN RESPONSES AT LEVELS B1 AND B2 AND THE DIFFERENCE BETWEEN THE MEANS AT LEVELS B3 AND B2.

(NOTE THAT THE SAME LABELS ARE USED FOR FACTOR LEVELS, MEAN RESPONSES AT FACTOR LEVELS AND FOR EFFECTS. FOR EXAMPLE, DEPENDING UPON THE PREFIX, B1 COULD BE LEVEL 1 OF FACTOR B THE MEAN RESPONSE AT LEVEL B1 OR THE FIRST MAIN EFFECT OF FACTOR B. ON THE PRINTED PAGE, IN TEXTBOOKS OR PAPERS, LOWER CASE LETTERS ARE USED FOR LEVELS, GREEK LETTERS FOR EFFECTS AND OVERBARS ARE USED TO DENOTE MEANS.

TO CONTINUE TYPE 1?1

MAIN EFFECTS CREATED BY THE USER

USER-DEFINED MAIN EFFECTS ARE SPECIFIED AS CONTRASTS AMONG MEAN RESPONSES AT THE LEVELS OF A FACTOR. THUS A THREE LEVEL FACTOR LIKE C WILL REQUIRE TWO CONTRASTS.

FOR EXAMPLE, THE USER COULD SPECIFY LINEAR AND QUADRATIC 'TRENDS' AS MAIN EFFECTS OF C,

E:C1 = LINEAR TREND = M:C3 - M:C1

AND

E:C2 = QUADRATIC TREND = M:C1 - 2*M:C2 + M:C3

CADA WOULD ASK THE USER TO TYPE THE CONTRAST COEFFICIENTS,

LEVELS OF FACTOR C	CONTRAST COEFFICIENTS	
	LINEAR	QUADRATIC
C1	-1	1
C2	0	-2
C3	1	1

TO CONTINUE TYPE 1?1

```
YOU MAY NOW DEFINE MAIN EFFECTS FOR EACH FACTOR.

MAIN EFFECTS OF FACTOR A (ADHESV)

     TO LET CADA CREATE MAIN EFFECTS            TYPE 1
     TO TYPE IN SPECIAL MAIN EFFECTS            TYPE 2
?1
MAIN EFFECTS OF FACTOR B (PRESUR)

     TO LET CADA CREATE MAIN EFFECTS            TYPE 1
     TO TYPE IN SPECIAL MAIN EFFECTS            TYPE 2
?2
```

```
MAIN EFFECT # 1    OF FACTOR  2    (PRESUR)
MAY NOW BE ENTERED.  THE EFFECT IS SPECIFIED AS A CONTRAST
AMONG MEAN RESPONSES AT THE  3    LEVELS OF THIS FACTOR.
TO ENSURE THAT THE COEFFICIENTS SUM TO ZERO, CADA WILL
SUPPLY THE LAST ONE.

AT LEVEL  1     THE CONTRAST COEFFICIENT=?-1
AT LEVEL  2     THE CONTRAST COEFFICIENT=?0
AT LEVEL  3     THE CONTRAST COEFFICIENT= 1

THIS CONTRAST WILL BE LABELLED: B 1
YOU MAY WANT TO MAKE A NOTE OF THIS SINCE CADA DOESN'T
PERMIT YOU TO SUPPLY EFFECT LABELS.

     TO CONTINUE                           TYPE 1
?1
```

```
HERE ARE THE CONTRAST COEFFICIENTS YOU JUST ENTERED:

FACTOR      CONTRAST
 LEVEL       COEFF.

   1         -1.000
   2          0.000
   3          1.000

IF YOU HAVE MADE AN ERROR YOU MAY RE-ENTER THE
CONTRAST COEFFICIENTS.

     TO CONTINUE                              TYPE 1
     TO RE-ENTER THE COEFFS                   TYPE 2
?1
```

```
MAIN EFFECT # 2    OF FACTOR  2    (PRESUR)
MAY NOW BE ENTERED.  THE EFFECT IS SPECIFIED AS A CONTRAST
AMONG MEAN RESPONSES AT THE  3    LEVELS OF THIS FACTOR.
TO ENSURE THAT THE COEFFICIENTS SUM TO ZERO, CADA WILL
SUPPLY THE LAST ONE.

AT LEVEL  1     THE CONTRAST COEFFICIENT=?1
AT LEVEL  2     THE CONTRAST COEFFICIENT=?-2
AT LEVEL  3     THE CONTRAST COEFFICIENT= 1

THIS CONTRAST WILL BE LABELLED: B 2
YOU MAY WANT TO MAKE A NOTE OF THIS SINCE CADA DOESN'T
PERMIT YOU TO SUPPLY EFFECT LABELS.

     TO CONTINUE                           TYPE 1
?1
```

```
HERE ARE THE CONTRAST COEFFICIENTS YOU JUST ENTERED:

FACTOR      CONTRAST
 LEVEL       COEFF.

   1           1.000
   2          -2.000
   3           1.000

IF YOU HAVE MADE AN ERROR YOU MAY RE-ENTER THE
CONTRAST COEFFICIENTS.

     TO CONTINUE                                TYPE 1
     TO RE-ENTER THE COEFFS                     TYPE 2
?1




ESTIMATING MAIN- AND INTERACTION EFFECTS.
   EXPLANATION WILL FOLLOW.

CADA HAS TO COMPUTE 12   EFFECTS AND THEIR
   INTERCORRELATIONS --- PLEASE STAND BY.

     COMPUTING EFFECT # 1
     COMPUTING EFFECT # 2
     COMPUTING EFFECT # 3
     COMPUTING EFFECT # 4
     COMPUTING EFFECT # 5
     COMPUTING EFFECT # 6
     COMPUTING EFFECT # 7
     COMPUTING EFFECT # 8
     COMPUTING EFFECT # 9
     COMPUTING EFFECT # 10
     COMPUTING EFFECT # 11
     COMPUTING EFFECT # 12

     COMPUTING CORRS: ROW 1
     COMPUTING CORRS: ROW 2
     COMPUTING CORRS: ROW 3
     COMPUTING CORRS: ROW 4
     COMPUTING CORRS: ROW 5
     COMPUTING CORRS: ROW 6
     COMPUTING CORRS: ROW 7
```

```
     COMPUTING CORRS: ROW 8
     COMPUTING CORRS: ROW 9
     COMPUTING CORRS: ROW 10
     COMPUTING CORRS: ROW 11
     COMPUTING CORRS: ROW 12

MAIN EFFECTS AND INTERACTIONS HAVE BEEN ESTIMATED AND
ARE NOW READY FOR ANALYSIS.

     TO CONTINUE                                      TYPE 1
     FOR AN EXPLANATION OF INTERACTIONS               TYPE 2
?2
```

```
     INTERACTIONS -- 'PRODUCTS' OF MAIN EFFECTS

CADA CREATES INTERACTION EFFECTS FROM THE MAIN EFFECTS
SPECIFIED BY THE USER OR CREATED BY CADA.

DEFINITIONS OF INTERACTIONS CAN BE DEDUCED BY FORMING
THE SYMBOLIC 'PRODUCT' OF THE MAIN EFFECTS IN THE
INTERACTION.

     TO CONTINUE                                 TYPE 1
?1
```

SYMBOLIC PRODUCTS OF MAIN EFFECTS

FOR EXAMPLE, SUPPOSE THAT FACTOR B HAD 2 LEVELS AND FACTOR C HAD 3 LEVELS. ASSUME THAT THE USER LET CADA GENERATE THE MAIN EFFECTS OF FACTOR B BUT ENTERED LINEAR AND QUADRATIC CONTRASTS AS THE MAIN EFFECTS OF FACTOR C. THE INTERACTION OF E:B1 AND E:C2, FOR EXAMPLE, IS DEDUCED AS FOLLOWS,

```
E:B1 = M:B2 - M:B1
E:C2 = M:C1 - 2*M:C2 + M:C3
```

THE SYMBOLIC PRODUCT IS,

```
(B2 - B1) X (C1 - 2*C2 + C3)
    = B2C1 - 2*B2C2 + B2C3 - B1C1 + 2*B1C2 - B1C3
```

THUS THE INTERACTION EFFECT, E:B1C2, IS,

```
M:B2C1 - 2*M:B2C2 + M:B2C3
  -M:B1C1 + 2*M:B1C2 - M:B1C3
```

TO CONTINUE TYPE 1?1

COMPONENT 51

FULL-RANK MODEL I FACTORIAL ANALYSIS OF VARIANCE

TO SET UP A FILE OF SUMMARY STATISTICS	TYPE 1
TO COMPUTE MAIN EFFECTS AND INTERACTIONS	TYPE 2
TO ANALYZE THEIR POSTERIOR DISTRIBUTION	TYPE 3
TO EXIT	TYPE 0

?3

POSTERIOR DISTRIBUTION OF THE EFFECTS

YOU MAY NOW BEGIN YOUR INVESTIGATION OF THE POSTERIOR DISTRIBUTION OF THE EFFECTS. AT THIS POINT ALL EFFECTS HAVE 'ACTIVE' STATUS IN OTHER WORDS, NO CONDITIONS HAVE BEEN IMPOSED ON THE DISTRIBUTION OF THE EFFECTS. AS THE ANALYSIS PROCEEDS, YOU MAY DECIDE TO STUDY THE CONDITIONAL DISTRIBUTION OF SOME EFFECTS GIVEN SPECIFIC VALUES FOR OTHER EFFECTS. FOR EXAMPLE, YOU MAY WANT TO STUDY THE CONDITIONAL DISTRIBUTION OF THE MAIN EFFECTS OF FACTOR B GIVEN THAT THE A BY B INTER-INTERACTIONS ARE ALL ZERO.

THE DISTRIBUTION OF THE EFFECTS IS BASED ON A 'NON-INFORMATIVE' PRIOR. IT IS IN THE FORM OF A 12 DIMENSIONAL MULTIVARIATE T DISTRIBUTION WITH 36 DEGREES OF FREEDOM. IN PARTICULAR, EACH INDIVIDUAL EFFECT HAS A UNIVARIATE T DISTRIBUTION WITH 36 DEGREES OF FREEDOM.

HERE IS A LIST OF THE EFFECT ESTIMATES (POSTERIOR MEANS) AND THEIR STANDARD DEVIATIONS

```
     TO CONTINUE                                  TYPE 1
?1
```

POSTERIOR MEANS AND STANDARD DEVIATIONS OF EFFECTS

ID#	EFFECT	STATUS	MEAN	STD. DEV.
1	CNSTNT	ACTIVE	+15.0625	+.706565
2	A1	ACTIVE	+1.16667	+1.99847
3	A2	ACTIVE	+4.00000	+1.99847
4	A3	ACTIVE	-5.25000	+1.99847
5	B1	ACTIVE	-.812500	+1.73072
6	B2	ACTIVE	-4.31250	+2.99770
7	A1B1	ACTIVE	-2.00000	+4.89523
8	A2B1	ACTIVE	+1.75000	+4.89523
9	A3B1	ACTIVE	+13.2500	+4.89523
10	A1B2	ACTIVE	+8.00000	+8.47878
11	A2B2	ACTIVE	-12.7500	+8.47878
12	A3B2	ACTIVE	-3.75000	+8.47878

DEGREES OF FREEDOM = 36

```
NOTE ANY INFORMATION YOU WANT TO REMEMBER.
     TO CONTINUE                             TYPE 1
     TO REPEAT LIST                          TYPE 2?1
```

YOU MAY ALSO OBTAIN INFORMATION ABOUT THE JOINT DISTRIBUTION OF TWO OR MORE EFFECTS BY STUDYING JOINT CREDIBILITY REGIONS FOR SELECTED EFFECTS.

AFTER STUDYING THE JOINT CREDIBILITY REGION YOU MAY CHOOSE TO CONDITION THE POSTERIOR DISTRIBUTION OF THE EFFECTS UPON SPECIFIED, FIXED VALUES OF SELECTED EFFECTS. FOR INSTANCE THE POSTERIOR DISTRIBUTION OF MAIN EFFECTS COULD BE CONDITIONED ON THE HYPOTHESIS THAT CERTAIN INTERACTION EFFECTS ARE ZERO, OR THAT THE MAIN EFFECTS OF A 'BLOCKING' FACTOR ARE ZERO.

YOU COULD THEN SELECT A SUBSET OF THE REMAINING (ACTIVE) EFFECTS FOR FURTHER INVESTIGATION.

TO CONTINUE TYPE 1?1

YOU WILL NOW BE ASKED TO SAY HOW EACH EFFECT IS TO BE TREATED IN THIS 'ROUND' OF YOUR STUDY OF THE POSTERIOR DISTRIBUTION. FOR EACH EFFECT YOU HAVE THREE CHOICES:

1. KEEP THE EFFECT -- LEARN SOMETHING ABOUT IT
2. CONDITION ON THE EFFECT -- SET IT TO A KNOWN VALUE.
3. MARGINALIZE THE EFFECT -- SKIP IT FOR THE MOMENT.

HERE ARE THE NAMES OF THE ACTIVE EFFECTS. AFTER EACH NAME TYPE 1,2 OR 3 TO INDICATE HOW THE EFFECT IS TO BE TREATED.

TO CONTINUE TYPE 1?1

```
ID# EFFECT        MEAN

 1  CNSTNT      +15.0625     OPTION (1=KEEP,2=COND,3=SKIP)?3
 2  A1          +1.16667     OPTION (1=KEEP,2=COND,3=SKIP)?3
 3  A2          +4.00000     OPTION (1=KEEP,2=COND,3=SKIP)?3
 4  A3          -5.25000     OPTION (1=KEEP,2=COND,3=SKIP)?3
 5  B1          -.812500     OPTION (1=KEEP,2=COND,3=SKIP)?3
 6  B2          -4.31250     OPTION (1=KEEP,2=COND,3=SKIP)?3
 7  A1B1        -2.00000     OPTION (1=KEEP,2=COND,3=SKIP)?1
 8  A2B1        +1.75000     OPTION (1=KEEP,2=COND,3=SKIP)?1
 9  A3B1        +13.2500     OPTION (1=KEEP,2=COND,3=SKIP)?1
10  A1B2        +8.00000     OPTION (1=KEEP,2=COND,3=SKIP)?1
11  A2B2        -12.7500     OPTION (1=KEEP,2=COND,3=SKIP)?1
12  A3B2        -3.75000     OPTION (1=KEEP,2=COND,3=SKIP)?1
```

```
YOU MAY CONTINUE YOUR STUDY OF THE DISTRIBUTION
THE SELECTED EFFECTS.

     FOR A LIST OF EFFECT MEANS AND S.D.'S              TYPE 1
     FOR CREDIBILITY REGION OF SEL. EFFECTS             TYPE 2
     FOR A DIFFERENT SET OF EFFECTS OR CONDITIONS       TYPE 3
       (KEEP OTHER EFFECTS FOR STUDY, CONDITION)
       (ON MORE EFFECTS, REDEFINE EFFECTS OR    )
       (RECALCULATE EFFECTS AT FIXED LEVELS OF  )
       (A FACTOR OR FACTORS.                    )
?2
```

INVESTIGATION OF CREDIBILITY

YOU WILL NOW BE ASKED TO ENTER HYPOTHETICAL VALUES FOR THE EFFECTS YOU HAVE SELECTED FOR ANALYSIS. CADA WILL THEN DETERMINE THE PROBABILITY CONTENT OF THE SMALLEST JOINT CREDIBILITY REGION (HDR) CONTAINING THESE VALUES.

TO CONTINUE TYPE 1
FOR MORE DETAILS TYPE 2

?2

CREDIBILITY REGIONS

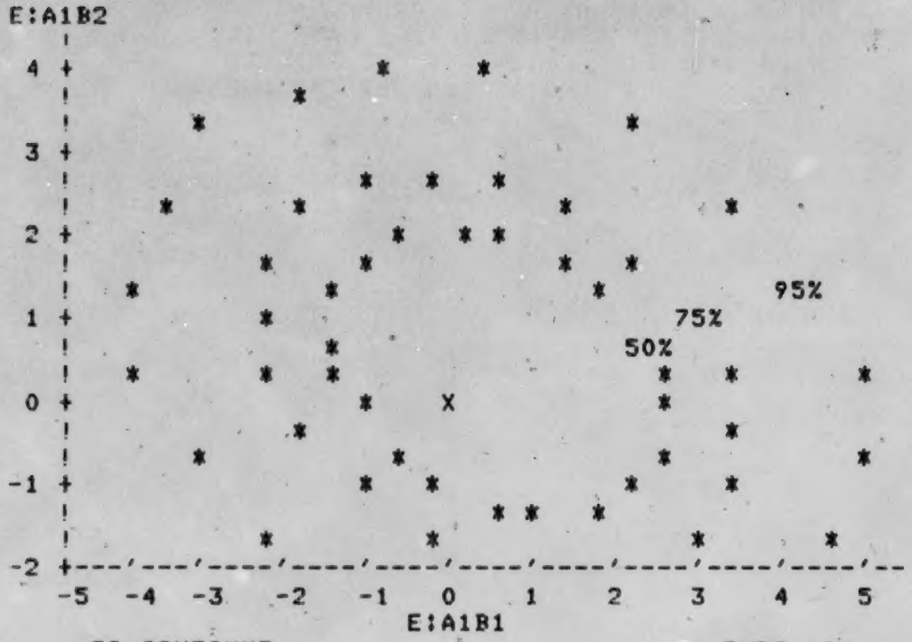
SUPPOSE THAT FACTOR A HAS 2 LEVELS AND FACTOR B HAS 3 LEVELS AND THAT YOU HAVE SELECTED THE INTERACTION EFFECTS (E:A1B1,E:A1B2) FOR ANALYSIS.

THE JOINT POSTERIOR DISTRIBUTION OF THESE EFFECTS IS BIVARIATE T. LET US SAY, FOR THE SAKE OF ILLUSTRATION, THAT THE POSTERIOR MEANS (ESTIMATES) OF THE EFFECTS ARE .5 AND .5 THE STANDARD ERRORS ARE 6.5 AND 6.0, THE CORRELATION BETWEEN THE EFFECTS IS -.40 AND THE DEGREES OF FREEDOM ARE 13.

SOME HIGHEST DENSITY REGIONS (HDR'S) OF THE JOINT DISTRIBUTION OF THESE EFFECTS ARE SHOWN IN THE NEXT FRAME. EACH HDR IS OUTLINED BY AN ELLIPSE LABELLED WITH ITS PROBABILITY CONTENT. THE POINT (0,0) WHICH REPRESENTING THE HYPOTHESIS OF NO INTERACTIONS ACTIONS IS SHOWN AS 'X'.

TO CONTINUE TYPE 1

?1



TO CONTINUE TYPE 1?1

THE JOINT CREDIBILITY OF A SET OF HYPOTHESIZED VALUES
IS THE INDICATED BY THE PROBABILITY CONTENT OF THE
SMALLEST HDR CONTAINING THE VALUES IN QUESTION.
THE SMALLER THIS PROBABILITY IS, THE MORE PLAUSIBLE IS
THE SET OF HYPOTHESIZED VALUES.

IN THIS CASE, WE SAW THAT THE POINT (0,0) WAS INSIDE THE
50% HDR SO THAT IT IS QUITE PLAUSIBLE.
ON THE OTHER HAND, THE POINT (1,3) IS CLOSE TO THE EDGE
OF THE 95% HDR AND SO IS SOMEWHAT IMPLAUSIBLE.

TO CONTINUE TYPE 1
TO SEE THE HDR'S AGAIN TYPE 2
?1

```
PLEASE ENTER HYPOTHETICAL VALUES FOR THE SELECTED EFFECTS.

EFFECT        MEAN

A1B1        -2.00000    HYP. VAL. = ?0
A2B1        +1.75000    HYP. VAL. = ?0
A3B1        +13.2500    HYP. VAL. = ?0
A1B2        +8.00000    HYP. VAL. = ?0
A2B2        -12.7500    HYP. VAL. = ?0
A3B2        -3.75000    HYP. VAL. = ?0

COMPUTING ... PLEASE STAND BY. THIS MAY TAKE A FEW MINUTES.

FINISHED!  TO CONTINUE                    TYPE 1?1




THE CREDIBILITY OF YOUR HYPOTHESIZED VALUES OF THE
EFFECTS CAN BE DETERMINED FROM THE PROBABILITY
CONTENT OF THE SMALLEST JOINT CREDIBILITY REGION
CONTAINING THE HYPOTHETICAL VALUES YOU JUST ENTERED.

     PROBABILITY = 0.978

     TO CONTINUE                          TYPE 1
?1
```

```
YOU MAY CONTINUE YOUR STUDY OF THE DISTRIBUTION
THE SELECTED EFFECTS.

     FOR A LIST OF EFFECT MEANS AND S.D.'S             TYPE 1
     FOR CREDIBILITY REGION OF SEL. EFFECTS            TYPE 2
     FOR A DIFFERENT SET OF EFFECTS OR CONDITIONS      TYPE 3
       (KEEP OTHER EFFECTS FOR STUDY, CONDITION)
       (ON MORE EFFECTS, REDEFINE EFFECTS OR    )
       (RECALCULATE EFFECTS AT FIXED LEVELS OF )
       (A FACTOR OR FACTORS.                    )
?3
```

```
YOU HAVE COMPLETED ANOTHER 'ROUND' OF THE ANALYSIS.
AT THIS POINT YOU MAY SELECT ANOTHER SUBSET OF EFFECTS
FOR ANALYSIS.  HOWEVER, IF YOU IMPOSED CONDITIONS
IN PREVIOUS STEPS, THEN THE POSTERIOR DISTRIBUTION OF THESE
EFFECTS WILL BE CONDITIONAL.

OTHER OPTIONS ARE ALSO AVAILABLE.  FOR EXAMPLE, IF YOU FOUND
SUBSTANTIAL INTERACTIONS AMONG EFFECTS A AND B, SAY, THEN YOU
MAY DECIDE TO LOOK AT SPECIFIC EFFECTS OF B AT EACH LEVEL OF
FACTOR A.  TO DO SO YOU WILL HAVE TO RETURN TO THE 'MAIN
EFFECT' MODULE TO REDEFINE THE EFFECTS OF B.

    TO CONTINUE WITH THE SAME EFFECT DEFINITIONS      TYPE 1
    TO REDEFINE THE MAIN EFFECTS                      TYPE 2
    TO EXIT                                           TYPE 0
?2
```

YOU MUST NOW TELL CADA HOW YOU WANT TO DEFINE THE MAIN EFFECTS OF EACH FACTOR. IF YOU HAVE NO PREFERENCE, CADA WILL DEFINE THE EFFECTS FOR YOU. HOWEVER, IF YOU WANT TO DEFINE THE MAIN EFFECTS YOU MAY DO SO BY TYPING IN SETS OF CONTRASTS.

CADA CREATES MAIN EFFECTS BY TAKING DIFFERENCES OF MEAN RESPONSES UNDER SUCCESSIVE LEVELS OF A FACTOR. FOR EXAMPLE, IF FACTOR A HAS 3 LEVELS, AND THE MEAN RESPONSES AT THESE LEVELS ARE DENOTED M:A1, M:A2 AND M:A3, THEN THE TWO MAIN EFFECTS OF FACTOR A ARE (M:A2 - M:A1) AND (M:A3 - M:A2).

```
     TO CONTINUE                                TYPE 1
     FOR MORE DETAILS                           TYPE 2
?2
```

IF THE ANALYSIS YOU JUST COMPLETED INDICATED THAT TWO OR MORE FACTORS INTERACT WITH EACH OTHER, THEN YOU MAY FIND IT USEFUL TO ANALYZE EFFECTS AND INTERACTIONS AT SPECIFIED LEVELS OF ONE OR MORE FACTORS. FOR EXAMPLE IF FACTORS A AND B INTERACT, THEN YOU MIGHT WANT TO LOOK AT THE EFFECTS OF FACTOR B SPECIFIC TO LEVEL A1, SAY, OF FACTOR A. THAT IS THE A1-SPECIFIC EFFECTS OF FACTOR B, OR THE 'SIMPLE' EFFECTS OF B AT LEVEL A1.

```
     TO CONTINUE                                TYPE 1
     FOR MORE DETAILS                           TYPE 2
?2
```

SPECIFIC (OR SIMPLE) MAIN EFFECTS

SUPPOSE THAT A NUMBER OF PEOPLE WERE GIVEN AN ARITHMETIC PROBLEM TO SOLVE UNDER VARIOUS LEVELS OF NOISE (FACTOR A) AND ILLUMINATION (FACTOR B). ASSUME THAT THERE ARE 3 LEVELS OF ILLUMINATION, B1=DIM, B2=NORMAL, B3=BRIGHT, AND 2 NOISE LEVELS, A1=QUIET, A2=NOISY. THE DEPENDENT VARIABLE IS THE TIME TO COMPLETE THE PROBLEM. THE RESULTS OF THE EXPERIMENT MIGHT LOOK LIKE THIS:

```
    !
    !      O * * * O * * * O  NOISY (A2)
    !
  T !      O
  I !        *
  M !          *
  E !            *
    !              O * * * O  QUIET (A1)
    +------+------+-------+------------
          DIM   NORMAL  BRIGHT
         (B1)    (B2)    (B3)
```

TO CONTINUE TYPE 1?1

SPECIFIC EFFECTS OF ILLUMINATION

NOTICE THAT WHEN THE ROOM IS QUIET, THE TIME TAKEN TO COMPLETE THE PROBLEM GOES DOWN AS THE ILLUMINATION IMPROVES BUT IN A NOISY ROOM THE TIME STAYS HIGH REGARDLESS OF THE ILLUMINATION. THUS THE EFFECT OF ILLUMINATION DEPENDS UPON THE NOISE LEVEL -- ILLUMINATION INTERACTS WITH NOISE.

UNDER THESE CIRCUMSTANCES, THE USER WOULD PROBABLY WANT TO STUDY THE EFFECTS OF ILLUMINATION SPECIFIC TO EACH NOISE LEVEL.

ASSUME FOR THE SAKE OF ILLUSTRATION THAT THE USER IS INTERESTED IN THE FOLLOWING EFFECTS:

EFFECT B1: NORMAL VS DIM ILLUMINATION
EFFECT B2: BRIGHT VS NORMAL ILLUMINATION

TO CONTINUE TYPE 1?1

(SPECIFIC EFFECTS OF ILLUMINATION)

IF THERE WERE NO INTERACTION, THEN THE USER WOULD ANALYZE THE USUAL MAIN EFFECTS:

```
EFFECT B1:  (M:B2 - M:B1)
EFFECT B2:  (M:B3 - M:B2)
```

(M:B1 IS THE MEAN RESPONSE AT LEVEL B1, ETC.)

BUT WHEN THERE ARE INTERACTIONS, SPECIFIC EFFECTS ARE MORE APPROPRIATE. EFFECT B1 CAN BE COMPUTED AT LEVEL A1 OR AT LEVEL A2. FOR EXAMPLE, THE SPECIFIC FORM OF EFFECT B1 AT LEVEL A1 OF FACTOR A IS THE DIFFERENCE BETWEEN THE MEAN RESPONSE AT LEVELS B1 AND B2 FOR ALL SUBJECTS EXPOSED TO LEVEL A1. THIS EFFECT IS SYMBOLIZED B1(A1) -- 'EFFECT B1 AT LEVEL A1'. THE EFFECTS OF FACTOR B AT SPECIFIC LEVELS OF FACTOR A ARE:

```
EFFECT B1(A1) = NORMAL,QUIET VS DIM,QUIET
EFFECT B1(A2) = NORMAL,NOISY VS DIM,NOISY
EFFECT B2(A1) = BRIGHT,QUIET VS NORMAL,QUIET
EFFECT B2(A2) = BRIGHT,NOISY VS NORMAL,NOISY
```

TO CONTINUE   TYPE 1

?1

(SPECIFIC EFFECTS OF ILLUMINATION)

IN OTHER WORDS, THE SPECIFIC EFFECTS OF FACTOR B AT LEVEL A1 OF FACTOR A ARE:

```
EFFECT B1(A1) :  (M:A1B2 - M:A1B1)
EFFECT B2(A1) :  (M:A1B3 - M:A1B2)
```

AND THE SPECIFIC EFFECTS OF FACTOR B AT LEVEL A2 ARE:

```
EFFECT B1(A2) :  (M:A2B2 - M:A2B1)
EFFECT B2(A2) :  (M:A2B3 - M:A2B2)
```

(HERE M:A2B2 IS THE MEAN OF ALL RESPONSES UNDER THE COMBINATION OF LEVEL 2 OF FACTOR A AND LEVEL 2 OF FACTOR B, ETC.

NOTE THAT ON THE PRINTED PAGE, GREEK LETTERS ARE USED TO SYMBOLIZE EFFECTS, LOWER CASE LATIN LETTERS SYMBOLIZE LEVELS OF FACTORS AND OVERBARS REPLACE THE 'M:' PREFIX.)

TO CONTINUE   TYPE 1

?1

HIGHER ORDER SPECIFIC EFFECTS

EFFECTS OF FACTOR B CAN OF COURSE BE STUDIED AT SPECIFIC LEVELS OF TWO OR MORE FACTORS. SUPPOSE, FOR INSTANCE THAT THE EXPERIMENTER ALSO VARIED THE TEMPERATURE (FACTOR C) AND HUMIDITY (FACTOR D) OF THE ROOM. IT WOULD THEN BE POSSIBLE TO STUDY THE SPECIFIC EFFECTS OF ILLUMINATION AT, SAY LOW NOISE AND HIGH HUMIDITY

IT IS ALSO POSSIBLE TO STUDY SPECIFIC INTERACTION EFFECTS FOR EXAMPLE, THE INTERACTION OF ILLUMINATION AND TEMPERATURE AT, SAY LOW NOISE LEVELS.

TO CONTINUE TYPE 1

?1

DO YOU WANT SPECIFIC EFFECTS FOR ANY FACTOR(S)?

IF ALL STANDARD EFFECTS ARE WANTED TYPE 1
IF SOME EFFECTS ARE TO BE SPECIFIC TYPE 2

?2

```
HERE ARE THE FACTORS IN YOUR DESIGN:

ID#    FACTOR    IDENTIFYING      NUMBER OF
        NAME        LETTER          LEVELS
----------------------------------------------
 1     ADHESV        A                 4
 2     PRESUR        B                 3


IF THE EFFECTS OF FACTOR # 1    ARE TO BE COMPUTED
AT SPECIFIC LEVELS OF OTHER FACTOR(S), TYPE IN THE
ID#'S OF THOSE FACTORS.

   TO SPECIFY A FACTOR                    TYPE ID#
   TO END THE LIST                        TYPE 0

FACTOR ID# = ?0
```

```
HERE ARE THE FACTORS IN YOUR DESIGN:

ID#    FACTOR    IDENTIFYING      NUMBER OF
        NAME        LETTER          LEVELS
----------------------------------------------
 1     ADHESV        A                 4
 2     PRESUR        B                 3


IF THE EFFECTS OF FACTOR # 2    ARE TO BE COMPUTED
AT SPECIFIC LEVELS OF OTHER FACTOR(S), TYPE IN THE
ID#'S OF THOSE FACTORS.

   TO SPECIFY A FACTOR                    TYPE ID#
   TO END THE LIST                        TYPE 0

FACTOR ID# = ?1
FACTOR ID# = ?0
```

```
YOU MAY NOW DEFINE MAIN EFFECTS FOR EACH FACTOR.

MAIN EFFECTS OF FACTOR A (ADHESV)

     TO LET CADA CREATE MAIN EFFECTS              TYPE 1
     TO TYPE IN SPECIAL MAIN EFFECTS              TYPE 2
?1
MAIN EFFECTS OF FACTOR B (PRESUR)

     TO LET CADA CREATE MAIN EFFECTS              TYPE 1
     TO TYPE IN SPECIAL MAIN EFFECTS              TYPE 2
?2
```

```
MAIN EFFECT # 1    OF FACTOR  2    (PRESUR)
MAY NOW BE ENTERED.  THE EFFECT IS SPECIFIED AS A CONTRAST
AMONG MEAN RESPONSES AT THE  3    LEVELS OF THIS FACTOR.
TO ENSURE THAT THE COEFFICIENTS SUM TO ZERO, CADA WILL
SUPPLY THE LAST ONE.

AT LEVEL  1     THE CONTRAST COEFFICIENT=?-1
AT LEVEL  2     THE CONTRAST COEFFICIENT=?0
AT LEVEL  3     THE CONTRAST COEFFICIENT= 1

THIS CONTRAST WILL BE LABELLED: B 1
YOU MAY WANT TO MAKE A NOTE OF THIS SINCE CADA DOESN'T
PERMIT YOU TO SUPPLY EFFECT LABELS.

     TO CONTINUE                           TYPE 1
?1
```

```
HERE ARE THE CONTRAST COEFFICIENTS YOU JUST ENTERED:

FACTOR       CONTRAST
 LEVEL        COEFF.

   1          -1.000
   2           0.000
   3           1.000

IF YOU HAVE MADE AN ERROR YOU MAY RE-ENTER THE
CONTRAST COEFFICIENTS.

     TO CONTINUE                              TYPE 1
     TO RE-ENTER THE COEFFS                   TYPE 2
?1
```

```
MAIN EFFECT # 2    OF FACTOR  2    (PRESUR)
MAY NOW BE ENTERED.  THE EFFECT IS SPECIFIED AS A CONTRAST
AMONG MEAN RESPONSES AT THE  3    LEVELS OF THIS FACTOR.
TO ENSURE THAT THE COEFFICIENTS SUM TO ZERO, CADA WILL
SUPPLY THE LAST ONE.

AT LEVEL  1     THE CONTRAST COEFFICIENT=?1
AT LEVEL  2     THE CONTRAST COEFFICIENT=?-2
AT LEVEL  3     THE CONTRAST COEFFICIENT= 1

THIS CONTRAST WILL BE LABELLED: B 2
YOU MAY WANT TO MAKE A NOTE OF THIS SINCE CADA DOESN'T
PERMIT YOU TO SUPPLY EFFECT LABELS.

     TO CONTINUE                           TYPE 1
?1
```

```
HERE ARE THE CONTRAST COEFFICIENTS YOU JUST ENTERED:

FACTOR      CONTRAST
 LEVEL       COEFF.

   1          1.000
   2         -2.000
   3          1.000

IF YOU HAVE MADE AN ERROR YOU MAY RE-ENTER THE
CONTRAST COEFFICIENTS.

     TO CONTINUE                                  TYPE 1
     TO RE-ENTER THE COEFFS                       TYPE 2
?1




ESTIMATING MAIN- AND INTERACTION EFFECTS.
   EXPLANATION WILL FOLLOW.

CADA HAS TO COMPUTE 12   EFFECTS AND THEIR
   INTERCORRELATIONS --- PLEASE STAND BY.

     COMPUTING EFFECT # 1
     COMPUTING EFFECT # 2
     COMPUTING EFFECT # 3
     COMPUTING EFFECT # 4
     COMPUTING EFFECT # 5
     COMPUTING EFFECT # 6
     COMPUTING EFFECT # 7
     COMPUTING EFFECT # 8
     COMPUTING EFFECT # 9
     COMPUTING EFFECT # 10
     COMPUTING EFFECT # 11
     COMPUTING EFFECT # 12

     COMPUTING CORRS: ROW 1
     COMPUTING CORRS: ROW 2
     COMPUTING CORRS: ROW 3
     COMPUTING CORRS: ROW 4
     COMPUTING CORRS: ROW 5
     COMPUTING CORRS: ROW 6
     COMPUTING CORRS: ROW 7
```

```
     COMPUTING CORRS: ROW 8
     COMPUTING CORRS: ROW 9
     COMPUTING CORRS: ROW 10
     COMPUTING CORRS: ROW 11
     COMPUTING CORRS: ROW 12

MAIN EFFECTS AND INTERACTIONS HAVE BEEN ESTIMATED AND
ARE NOW READY FOR ANALYSIS.

     TO CONTINUE                                  TYPE 1
     FOR AN EXPLANATION OF INTERACTIONS           TYPE 2
?1
```

```
               COMPONENT 51

   FULL-RANK MODEL I FACTORIAL ANALYSIS OF VARIANCE


     TO SET UP A FILE OF SUMMARY STATISTICS       TYPE 1
     TO COMPUTE MAIN EFFECTS AND INTERACTIONS     TYPE 2
     TO ANALYZE THEIR POSTERIOR DISTRIBUTION      TYPE 3
     TO EXIT                                      TYPE 0
?3
```

POSTERIOR DISTRIBUTION OF THE EFFECTS

YOU MAY NOW BEGIN YOUR INVESTIGATION OF THE POSTERIOR DISTRIBUTION OF THE EFFECTS. AT THIS POINT ALL EFFECTS HAVE 'ACTIVE' STATUS IN OTHER WORDS, NO CONDITIONS HAVE BEEN IMPOSED ON THE DISTRIBUTION OF THE EFFECTS. AS THE ANALYSIS PROCEEDS, YOU MAY DECIDE TO STUDY THE CONDITIONAL DISTRIBUTION OF SOME EFFECTS GIVEN SPECIFIC VALUES FOR OTHER EFFECTS. FOR EXAMPLE, YOU MAY WANT TO STUDY THE CONDITIONAL DISTRIBUTION OF THE MAIN EFFECTS OF FACTOR B GIVEN THAT THE A BY B INTER-INTERACTIONS ARE ALL ZERO.

THE DISTRIBUTION OF THE EFFECTS IS BASED ON A 'NON-INFORMATIVE' PRIOR. IT IS IN THE FORM OF A 12 DIMENSIONAL MULTIVARIATE T DISTRIBUTION WITH 36 DEGREES OF FREEDOM. IN PARTICULAR, EACH INDIVIDUAL EFFECT HAS A UNIVARIATE T DISTRIBUTION WITH 36 DEGREES OF FREEDOM.

HERE IS A LIST OF THE EFFECT ESTIMATES (POSTERIOR MEANS) AND THEIR STANDARD DEVIATIONS

TO CONTINUE TYPE 1

?1

POSTERIOR MEANS AND STANDARD DEVIATIONS OF EFFECTS

ID#	EFFECT	STATUS	MEAN	STD. DEV.
1	CNSTNT	ACTIVE	+15.0625	+.706565
2	A1	ACTIVE	+1.16667	+1.99847
3	A2	ACTIVE	+4.00000	+1.99847
4	A3	ACTIVE	-5.25000	+1.99847
5	B1(A1)	ACTIVE	-3.50000	+3.46145
6	B1(A2)	ACTIVE	-5.50000	+3.46145
7	B1(A3)	ACTIVE	-3.75000	+3.46145
8	B1(A4)	ACTIVE	+9.50000	+3.46145
9	B2(A1)	ACTIVE	-3.00000	+5.99540
10	B2(A2)	ACTIVE	+5.00000	+5.99540
11	B2(A3)	ACTIVE	-7.75000	+5.99540
12	B2(A4)	ACTIVE	-11.5000	+5.99540

DEGREES OF FREEDOM = 36

NOTE ANY INFORMATION YOU WANT TO REMEMBER.

TO CONTINUE TYPE 1

TO REPEAT LIST TYPE 2?1

YOU MAY ALSO OBTAIN INFORMATION ABOUT THE JOINT DISTRIBUTION OF TWO OR MORE EFFECTS BY STUDYING JOINT CREDIBILITY REGIONS FOR SELECTED EFFECTS.

AFTER STUDYING THE JOINT CREDIBILITY REGION YOU MAY CHOOSE TO CONDITION THE POSTERIOR DISTRIBUTION OF THE EFFECTS UPON SPECIFIED, FIXED VALUES OF SELECTED EFFECTS. FOR INSTANCE THE POSTERIOR DISTRIBUTION OF MAIN EFFECTS COULD BE CON-DITIONED ON THE HYPOTHESIS THAT CERTAIN INTERACTION EFFECTS ARE ZERO, OR THAT THE MAIN EFFECTS OF A 'BLOCKING' FACTOR ARE ZERO.

YOU COULD THEN SELECT A SUBSET OF THE REMAINING (ACTIVE) EFFECTS FOR FURTHER INVESTIGATION.

TO CONTINUE TYPE 1?1

YOU WILL NOW BE ASKED TO SAY HOW EACH EFFECT IS TO BE TREATED IN THIS 'ROUND' OF YOUR STUDY OF THE POSTERIOR DISTRIBUTION. FOR EACH EFFECT YOU HAVE THREE CHOICES:

1. KEEP THE EFFECT -- LEARN SOMETHING ABOUT IT
2. CONDITION ON THE EFFECT -- SET IT TO A KNOWN VALUE.
3. MARGINALIZE THE EFFECT -- SKIP IT FOR THE MOMENT.

HERE ARE THE NAMES OF THE ACTIVE EFFECTS. AFTER EACH NAME TYPE 1,2 OR 3 TO INDICATE HOW THE EFFECT IS TO BE TREATED.

TO CONTINUE TYPE 1?1

```
ID# EFFECT        MEAN

 1  CNSTNT      +15.0625    OPTION (1=KEEP,2=COND,3=SKIP)?3
 2  A1          +1.16667    OPTION (1=KEEP,2=COND,3=SKIP)?3
 3  A2          +4.00000    OPTION (1=KEEP,2=COND,3=SKIP)?3
 4  A3          -5.25000    OPTION (1=KEEP,2=COND,3=SKIP)?3
 5  B1(A1)      -3.50000    OPTION (1=KEEP,2=COND,3=SKIP)?3
 6  B1(A2)      -5.50000    OPTION (1=KEEP,2=COND,3=SKIP)?3
 7  B1(A3)      -3.75000    OPTION (1=KEEP,2=COND,3=SKIP)?3
 8  B1(A4)      +9.50000    OPTION (1=KEEP,2=COND,3=SKIP)?1
 9  B2(A1)      -3.00000    OPTION (1=KEEP,2=COND,3=SKIP)?3
10  B2(A2)      +5.00000    OPTION (1=KEEP,2=COND,3=SKIP)?3
11  B2(A3)      -7.75000    OPTION (1=KEEP,2=COND,3=SKIP)?3
12  B2(A4)      -11.5000    OPTION (1=KEEP,2=COND,3=SKIP)?1
```

```
YOU MAY CONTINUE YOUR STUDY OF THE DISTRIBUTION
THE SELECTED EFFECTS.

     FOR A LIST OF EFFECT MEANS AND S.D.'S            TYPE 1
     FOR CREDIBILITY REGION OF SEL. EFFECTS           TYPE 2
     FOR A DIFFERENT SET OF EFFECTS OR CONDITIONS     TYPE 3
       (KEEP OTHER EFFECTS FOR STUDY, CONDITION)
       (ON MORE EFFECTS, REDEFINE EFFECTS OR    )
       (RECALCULATE EFFECTS AT FIXED LEVELS OF  )
       (A FACTOR OR FACTORS.                    )
?1
```

POSTERIOR MEANS AND STANDARD DEVIATIONS OF EFFECTS

ID#	EFFECT	STATUS	MEAN	STD. DEV.
8	B1(A4)	ACTIVE	+9.50000	+3.46145
12	B2(A4)	ACTIVE	-11.5000	+5.99540

DEGREES OF FREEDOM = 36

NOTE ANY INFORMATION YOU WANT TO REMEMBER.
TO CONTINUE TYPE 1
TO REPEAT LIST TYPE 2?1

YOU MAY CONTINUE YOUR STUDY OF THE DISTRIBUTION
THE SELECTED EFFECTS.

FOR A LIST OF EFFECT MEANS AND S.D.'S TYPE 1
FOR CREDIBILITY REGION OF SEL. EFFECTS TYPE 2
FOR A DIFFERENT SET OF EFFECTS OR CONDITIONS TYPE 3
(KEEP OTHER EFFECTS FOR STUDY, CONDITION)
(ON MORE EFFECTS, REDEFINE EFFECTS OR)
(RECALCULATE EFFECTS AT FIXED LEVELS OF)
(A FACTOR OR FACTORS.)
?2

INVESTIGATION OF CREDIBILITY

YOU WILL NOW BE ASKED TO ENTER HYPOTHETICAL VALUES FOR THE EFFECTS YOU HAVE SELECTED FOR ANALYSIS. CADA WILL THEN DETERMINE THE PROBABILITY CONTENT OF THE SMALLEST JOINT CREDIBILITY REGION (HDR) CONTAINING THESE VALUES.

```
     TO CONTINUE                                    TYPE 1
     FOR MORE DETAILS                               TYPE 2
?1
```

PLEASE ENTER HYPOTHETICAL VALUES FOR THE SELECTED EFFECTS.

```
EFFECT        MEAN

B1(A4)      +9.50000     HYP. VAL. = ?0
B2(A4)      -11.5000     HYP. VAL. = ?0
```

COMPUTING ... PLEASE STAND BY. THIS MAY TAKE A FEW MINUTES.

```
FINISHED!  TO CONTINUE                        TYPE 1?1
```

```
THE CREDIBILITY OF YOUR HYPOTHESIZED VALUES OF THE
EFFECTS CAN BE DETERMINED FROM THE PROBABILITY
CONTENT OF THE SMALLEST JOINT CREDIBILITY REGION
CONTAINING THE HYPOTHETICAL VALUES YOU JUST ENTERED.

     PROBABILITY = 0.994

     TO CONTINUE                                 TYPE 1
?1
```

```
YOU MAY CONTINUE YOUR STUDY OF THE DISTRIBUTION
THE SELECTED EFFECTS.

     FOR A LIST OF EFFECT MEANS AND S.D.'S             TYPE 1
     FOR CREDIBILITY REGION OF SEL. EFFECTS            TYPE 2
     FOR A DIFFERENT SET OF EFFECTS OR CONDITIONS      TYPE 3
       (KEEP OTHER EFFECTS FOR STUDY, CONDITION)
       (ON MORE EFFECTS, REDEFINE EFFECTS OR    )
       (RECALCULATE EFFECTS AT FIXED LEVELS OF  )
       (A FACTOR OR FACTORS.                    )
?3
```

```
YOU HAVE COMPLETED ANOTHER 'ROUND' OF THE ANALYSIS.
AT THIS POINT YOU MAY SELECT ANOTHER SUBSET OF EFFECTS
FOR ANALYSIS.  HOWEVER, IF YOU IMPOSED CONDITIONS
IN PREVIOUS STEPS, THEN THE POSTERIOR DISTRIBUTION OF THESE
EFFECTS WILL BE CONDITIONAL.

OTHER OPTIONS ARE ALSO AVAILABLE.  FOR EXAMPLE, IF YOU FOUND
SUBSTANTIAL INTERACTIONS AMONG EFFECTS A AND B, SAY, THEN YOU
MAY DECIDE TO LOOK AT SPECIFIC EFFECTS OF B AT EACH LEVEL OF
FACTOR A.  TO DO SO YOU WILL HAVE TO RETURN TO THE 'MAIN
EFFECT' MODULE TO REDEFINE THE EFFECTS OF B.

    TO CONTINUE WITH THE SAME EFFECT DEFINITIONS      TYPE 1
    TO REDEFINE THE MAIN EFFECTS                      TYPE 2
    TO EXIT                                           TYPE 0
?0
```

```
                COMPONENT 51

    FULL-RANK MODEL I FACTORIAL ANALYSIS OF VARIANCE

     TO SET UP A FILE OF SUMMARY STATISTICS       TYPE 1
     TO COMPUTE MAIN EFFECTS AND INTERACTIONS     TYPE 2
     TO ANALYZE THEIR POSTERIOR DISTRIBUTION      TYPE 3
     TO EXIT                                      TYPE 0
?0
```

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?

```
     THIS EXAMPLE USES DATA FROM TABLE 7.8-3 OF WINER,B.J.,'STATISTICAL
PRINCIPLES IN EXPERIMENTAL DESIGN, SECOND EDITION,' MCGRAW-HILL,1971.




     COMPONENT GROUPS

1.   DATA MANAGEMENT FACILITY
2.   SIMPLE BAYESIAN PARAMETRIC MODELS
3.   DECISION THEORETIC MODELS
4.   BAYESIAN SIMULTANEOUS ESTIMATION
5.   BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.   BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.   ELEMENTARY CLASSICAL STATISTICS
8.   EXPLORATORY DATA ANALYSIS
9.   PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?1




COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12.  DATA MOVEMENT     ( INPUT/OUTPUT, EDITING )
13.  DATA TRANSFORMATIONS
14.  FILE MAINTENANCE  ( DATA GROUPING )

   * NOT YET AVAILABLE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?12
```

COMPONENT 12. DATA MOVEMENT

1. DATA ENTRY AND TRANSFERS
2. DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0')?1

MODEL 1. DATA ENTRY AND TRANSFERS

1. DATA ENTRY FROM THE TERMINAL
2. DATA TRANSFER FROM DISK
3. DATA TRANSFER FROM THE CATALOG

4. DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0')?1

```
        DATA ENTRY FROM THE TERMINAL

YOU CAN CONSTRUCT A DATA SET WITH A MAXIMUM OF 1000 ENTRIES.
THE DATA MAY BE GROUPED (MAX=12) OR UNGROUPED, UNIVARIATE
OR MULTIVARIATE (MAX=5).

     1. UNGROUPED UNIVARIATE
     2. UNGROUPED MULTIVARIATE
     3. GROUPED UNIVARIATE
     4. GROUPED MULTIVARIATE

ENTER THE NUMBER OF THE KIND OF DATA YOU HAVE.?2
```

```
                 UNGROUPED MULTIVARIATE DATA

ENTER THE NUMBER OF VARIABLES  ( MAX=5 ). TO EXIT, TYPE '0'.?4

YOU CAN EITHER SPECIFY THE VARIABLE NAMES OR LET THE
MODULE ASSIGN THE NAMES VAR-01, VAR-02, ETC..

     TO USE DEFAULT NAMES,   TYPE '1'.
     TO ASSIGN NAMES,        TYPE '2'.?2

ENTER THE VARIABLE NAMES.  THE MAXIMUM LENGTH IS 6 CHARACTERS.

NAME FOR VARIABLE  1    .?FCTR A
NAME FOR VARIABLE  2    .?SUBJCT
NAME FOR VARIABLE  3    .?FCTR B
NAME FOR VARIABLE  4    .?DEPVAR

ENTER THE NUMBER OF OBSERVATIONS  ( MAX= 250 ). TO EXIT, TYPE '0'.?36
```

```
ENTER THE VARIABLE VALUES FOR THIS SET OF OBSERVATIONS.
ENTER THE VALUES SEPARATED BY COMMAS.  FOR EXAMPLE, IF THERE ARE
TWO VARIABLES AND THE VALUES ARE 4 AND 5 FOR THE FIRST OBSERVATION,
YOU SHOULD ENTER :  '4,5'.


OBSERVATIONS        1  -  10
VARIABLES          FCTR A   SUBJCT   FCTR B   DEPVAR
--------------------------------------------------------
OBS.   1 :?1,1,1,3
OBS.   2 :?1,1,2,6
OBS.   3 :?1,1,3,9
OBS.   4 :?1,2,1,6
OBS.   5 :?1,2,2,10
OBS.   6 :?1,2,3,14
OBS.   7 :?1,3,1,10
OBS.   8 :?1,3,2,15
OBS.   9 :?1,3,3,18
OBS.  10 :?2,4,1,8
--------------------------------------------------------
IF YOU WANT TO CONTINUE ENTERING DATA,         TYPE '1'.
IF YOU WANT TO EDIT THIS SET OF OBSERVATIONS,  TYPE '2'.
IF YOU WANT TO STOP ENTERING DATA,             TYPE '3'.?1


ENTER THE VARIABLE VALUES FOR THIS SET OF OBSERVATIONS.

OBSERVATIONS       11  -  20
VARIABLES          FCTR A   SUBJCT   FCTR B   DEPVAR
--------------------------------------------------------
OBS.  11 :?2,4,2,12
OBS.  12 :?2,4,3,16
OBS.  13 :?2,5,1,3
OBS.  14 :?2,5,2,5
OBS.  15 :?2,5,3,8
OBS.  16 :?2,6,1,1
OBS.  17 :?2,6,2,3
OBS.  18 :?2,6,3,8
OBS.  19 :?2,7,1,12
OBS.  20 :?2,7,2,18
--------------------------------------------------------
IF YOU WANT TO CONTINUE ENTERING DATA,         TYPE '1'.
IF YOU WANT TO EDIT THIS SET OF OBSERVATIONS,  TYPE '2'.
IF YOU WANT TO STOP ENTERING DATA,             TYPE '3'.?1
```

```
ENTER THE VARIABLE VALUES FOR THIS SET OF OBSERVATIONS.

OBSERVATIONS        21  -  30
VARIABLES           FCTR A   SUBJCT   FCTR B   DEPVAR
----------------------------------------------------------
OBS.  21 :?2,7,3,26
OBS.  22 :?2,8,1,9
OBS.  23 :?2,8,2,10
OBS.  24 :?2,8,3,18
OBS.  25 :?3,9,1,10
OBS.  26 :?3,9,2,22
OBS.  27 :?3,9,3,16
OBS.  28 :?3,10,1,3
OBS.  29 :?3,10,2,15
OBS.  30 :?3,10,3,8
----------------------------------------------------------
IF YOU WANT TO CONTINUE ENTERING DATA,          TYPE '1'.
IF YOU WANT TO EDIT THIS SET OF OBSERVATIONS,   TYPE '2'.
IF YOU WANT TO STOP ENTERING DATA,              TYPE '3'.?1
```

```
ENTER THE VARIABLE VALUES FOR THIS SET OF OBSERVATIONS.

OBSERVATIONS        31  -  36
VARIABLES           FCTR A   SUBJCT   FCTR B   DEPVAR
----------------------------------------------------------
OBS.  31 :?3,11,1,7
OBS.  32 :?3,11,2,16
OBS.  33 :?3,11,3,10
OBS.  34 :?3,12,1,5
OBS.  35 :?3,12,2,20
OBS.  36 :?3,12,3,12
----------------------------------------------------------
IF YOU WANT TO CONTINUE ENTERING DATA,          TYPE '1'.
IF YOU WANT TO EDIT THIS SET OF OBSERVATIONS,   TYPE '2'.
IF YOU WANT TO STOP ENTERING DATA,              TYPE '3'.?1
```

```
    DESCRIPTION OF DATA SET

VARIABLES
 1. FCTR A
 2. SUBJCT
 3. FCTR B
 4. DEPVAR

NUMBER OF OBSERVATIONS =   36

IF YOU WANT TO PROCEED TO AN ANALYSIS,    TYPE '1'.
IF YOU WANT TO REMAIN IN DATA MANAGEMENT, TYPE '2'.?1
```

```
     COMPONENT GROUPS

1.   DATA MANAGEMENT FACILITY
2.   SIMPLE BAYESIAN PARAMETRIC MODELS
3.   DECISION THEORETIC MODELS
4.   BAYESIAN SIMULTANEOUS ESTIMATION
5.   BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.   BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.   ELEMENTARY CLASSICAL STATISTICS
8.   EXPLORATORY DATA ANALYSIS
9.   PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?5
```

```
COMPONENT GROUP 5.  BAYESIAN FULL-RANK ANALYSIS OF VARIANCE

51.  FULL-RANK MODEL I FACTORIAL ANALYSIS OF VARIANCE
52.  BAYESIAN ANALYSIS OF REPEATED-MEASURES DESIGNS


TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?52
```

```
        ANALYSIS OF REPEATED MEASURES DESIGNS

     1.  PUT DESCRIPTION OF LAYOUT OF EXPERIMENT ON FILE
     2.  PUT PRIOR INFORMATION ON FILE
     3.  PUT SUMMARY STATISTICS ON FILE
     4.  COMPUTE POSTERIOR DISTRIBUTION OF CELL MEANS
     5.  TRANSFORM CELL MEANS TO EFFECTS AND INTERACTIONS
     6.  EXAMINE MATRIC-T DISTRIBUTION OF PARAMETERS

     7.  TUTORIAL

     0.  EXIT

     TYPE IN YOUR CHOICE.?1
```

```
A DATA SET NAMED NONAME IS NOW ON YOUR PERSONAL FILE.
IT APPEARS TO BE A SET OF RAW DATA.

     IF YOU INTEND TO ANALYZE THIS DATA      TYPE 1
     OTHERWISE                               TYPE 0?1
```

```
          WARNING !!

THE DATA SET NONAME NOW ON THE PERSONAL FILE
WILL SOON BE REPLACED BY A SET OF SUMMARY DATA.
IF YOU WANT TO RETURN TO THE DATA MANAGEMENT
COMPONENT AND SAVE THIS DATA SET ON A PERMANENT FILE
NOW IS THE TIME TO EXIT AND DO SO.

    TO CONTINUE                              TYPE 1
    TO EXIT                                  TYPE 0
?1
```

```
HERE ARE THE VARIABLES IN THE DATA SET:

 1. FCTR A   2. SUBJCT   3. FCTR B   4. DEPVAR

THERE ARE FOUR POSSIBLE TYPES OF VARIABLES
     1. BETWEEN SUBJECTS FACTOR (NOMINAL)
     2. WITHIN  SUBJECTS FACTOR (NOMINAL)
     3. DEPENDENT VARIABLE      (SCALAR)
     0. NOT IN THE ANALYSIS

HERE, AGAIN, IS THE LIST OF VARIABLES.  AFTER EACH
VARIABLE'S NAME, ENTER ITS TYPE NUMBER FROM THE ABOVE
LIST.

VARIABLE FCTR A IS OF TYPE# ?1
VARIABLE SUBJCT IS OF TYPE# ?0
VARIABLE FCTR B IS OF TYPE# ?2
VARIABLE DEPVAR IS OF TYPE# ?3
```

```
HERE ARE THE FACTORS IN YOUR DESIGN:

BETWEEN SUBJECTS FACTORS:

ID#   FACTOR   IDENTIFYING     NUMBER OF
       NAME      LETTER          LEVELS
-----------------------------------------
 1    FCTR A       A                3

WITHIN SUBJECTS FACTORS:

ID#   FACTOR   IDENTIFYING     NUMBER OF
       NAME      LETTER          LEVELS
-----------------------------------------
 2    FCTR B       B                3

AND THE DEPENDENT VARIABLE IS,
 1. DEPVAR

    TO CONTINUE                                    TYPE 1?1
```

```
COMPUTING AND FILING SUMMARY STATISTICS -- STAND BY

FINISHED!

SUMMARY DATA WILL NOW BE WRITTEN ON THE PERSONAL FILE
PLEASE ENTER A 5-CHARACTER NAME FOR THIS DATA SET.
CADA WILL ADD A '$' TO THE END OF THE NAME TO INDICATE
THAT THIS IS A SET OF SUMMARY DATA.

DATA SET NAME IS?W783

     TO CONTINUE                                TYPE 1?1
```

```
        ANALYSIS OF REPEATED MEASURES DESIGNS

     1.  PUT DESCRIPTION OF LAYOUT OF EXPERIMENT ON FILE
     2.  PUT PRIOR INFORMATION ON FILE
     3.  PUT SUMMARY STATISTICS ON FILE
     4.  COMPUTE POSTERIOR DISTRIBUTION OF CELL MEANS
     5.  TRANSFORM CELL MEANS TO EFFECTS AND INTERACTIONS
     6.  EXAMINE MATRIC-T DISTRIBUTION OF PARAMETERS

     7.  TUTORIAL

     0.  EXIT

     TYPE IN YOUR CHOICE.?5
```

```
YOU MAY NOW TELL CADA HOW YOU WANT TO DEFINE THE MAIN.
EFFECTS OF EACH FACTOR. YOU HAVE THE OPTION OF ALLOWING
CADA TO DEFINE THE MAIN EFFECTS -- EITHER SUCCESSIVE
DIFFERENCES OR ORTHOGONAL POLYNOMIALS -- OR OF DEFINING
YOUR OWN MAIN EFFECTS BY TYPING IN CONTRAST COEFFICIENTS.

YOU MAY ALSO CHOOSE TO USE ONE OR MORE FACTORS TO 'BREAK
DOWN' THE ANALYSIS.  IN OTHER WORDS, YOU MAY BREAK THE DATA
INTO SUBSETS DEFINED BY LEVELS OF THE 'BREAKDOWN' FACTORS AND
CALCULATE EFFECTS AND INTERACTIONS OF THE OTHER FACTORS
SEPARATELY FOR EACH OF THESE SUBSETS.

YOUR OPTIONS FOR EACH FACTOR ARE:

     1.CADA STANDARD EFFECTS -- SUCCESSIVE DIFFERENCES.
     2.ORTHOGONAL POLYNOMIALS -- ASSUMING EQUAL SPACING.
     3.USER-DEFINED EFFECTS -- CONTRASTS.

     4.USE AS A BREAKDOWN FACTOR

     TO CONTINUE                                 TYPE 1
     FOR TUTORIAL                                TYPE 2
?1
```

```
YOU WILL NOW BE SHOWN A LIST OF THE FACTORS. AFTER EACH
FACTOR TYPE 1,2,3 OR 4 TO INDICATE HOW THE FACTOR IS TO
BE USED IN THE ANALYSIS.

 1. FCTR A #LEVELS= 3

     OPTION (1=STANDARD, 2=ORTH POLS, 3=CONTRASTS; 4=BREAKDOWN)?2

 2. FCTR B #LEVELS= 3

     OPTION (1=STANDARD, 2=ORTH POLS, 3=CONTRASTS; 4=BREAKDOWN)?1
```

```
CADA IS NOW TRANSFORMING THE POSTERIOR DISTRIBUTION OF THE CELL
MEANS INTO THE POSTERIOR DISTRIBUTION OF THE MAIN EFFECTS AND
INTERACTIONS.  THIS CALCULATION MAY TAKE SEVERAL MINUTES,
SO PLEASE BE PATIENT.

WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...

THE TRANSFORMED DISTRIBUTION IS NOW ON FILE.

     TO EXAMINE THIS DISTRIBUTION                TYPE 1
     TO REPLACE IT WITH A NEW TRANSFORMATION    TYPE 2
?1
```

```
MATRIC T DISTRIBUTION

(CALCULATING THE DETERMINANT OF THE RESIDUAL MATRIX.)
(PLEASE BE PATIENT --- THIS MAY TAKE A WHILE!)

     TO CONTINUE                                     TYPE 1?1
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,               TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),    TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                    TYPE 3
  FOR TUTORIAL                                                 TYPE 4
  TO EXIT,                                                     TYPE 0
?1
```

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```
MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
                          A. FCTR A  B. FCTR B

DEPENDENT VARIABLE, DEPVAR

ID# EFFECT              STATUS     MEAN      STD. DEV.

 1. MEAN                ACTIVE +10.8593    +1.59345
 2. A1                  ACTIVE +1.33565    +2.91696
 3. A2                  ACTIVE +.480826    +2.59343
 4. B1                  ACTIVE +6.33333    +.669043
 5. B2                  ACTIVE +.727777    +.553245
 6. A1B1                ACTIVE +5.65686    +1.22474
 7. A2B1                ACTIVE +4.08248    +1.08890
 8. A1B2                ACTIVE -7.13000    +1.01277
 9. A2B2                ACTIVE -5.96723    +.900436

     TO CONTINUE                                TYPE 1?1
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                   TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE), TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                        TYPE 3
  FOR TUTORIAL                                                     TYPE 4
  TO EXIT,                                                         TYPE 0
?2
```

ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE)

```
  TO REMOVE ALL CONDITIONS AND MARGINALIZATIONS,  TYPE 1
  TO ADD CONDITIONS AND/OR MARGINALIZATIONS,      TYPE 2
  TO EXIT,                                        TYPE 0
?2
```

ASSIGN PARAMETER STATUS

YOU MAY NOW SAY HOW YOU WANT EACH PARAMETER TO BE TREATED IN THIS STAGE OF YOUR ANALYSIS. FOR EACH PARAMETER YOU MAY,

1. KEEP PARAMETER IN THE ANALYSIS -- LEARN SOMETHING ABOUT IT
2. CONDITIONALIZE THE PARAMETER -- SET IT TO A KNOWN VALUE.
3. MARGINALIZE THE PARAMETER -- IGNORE IT FOR THE MOMENT.

THE PATTERN OF CONDITIONING AND MARGINALIZING CANNOT BE TOTALLY ARBITRARY BUT MUST FOLLOW CERTAIN RULES -- BRIEFLY, YOU MUST MARGINALIZE OR CONDITIONALIZE ENTIRE ROWS AND OR COLUMNS OF THE 'PARAMETER TABLE'. FOR MORE DETAILS, EXIT AND SELECT THE TUTORIAL.

```
    TO CONTINUE                               TYPE 1
    TO EXIT                                   TYPE 0?1
```

CURRENT STATUS OF PARAMETERS

```
        1  2  3
        +  +  +
    1+  A  A  A
    2+  A  A  A
    3+  A  A  A
```

ROWS: 1.MU   2.A1   3.A2

COLS: 1.MU   2.B1   3.B2

KEY: ROWS=BETWEEN, COLS=WITHIN, A=ACTIVE, *=CONDITIONED, MU=MEAN

TO CONTINUE   TYPE 1?1

STATUS OF ROWS OF PARAMETER TABLE

```
------------------------------------------
ROW  1.  NAME: MU  NEW STATUS (1=KEEP 2=COND 3=MARG): ?3
ROW  2.  NAME: A1  NEW STATUS (1=KEEP 2=COND 3=MARG): ?1
ROW  3.  NAME: A2  NEW STATUS (1=KEEP 2=COND 3=MARG): ?1
```

```
STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y1 (DEPVAR)

----------------------------------------
COL  1.  NAME: MU   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL  2.  NAME: B1   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
COL  3.  NAME: B2   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
```

```
                    CURRENT STATUS OF PARAMETERS

                              1  2  3
                              +  +  +
                          1+
                          2+     A  A
                          3+     A  A

ROWS:   1.MU   2.A1   3.A2

COLS:   1.MU   2.B1   3.B2

KEY:  ROWS=BETWEEN, COLS=WITHIN, A=ACTIVE, *=CONDITIONED, MU=MEAN

  IS THIS WHAT YOU WANTED? (1=YES.  2=NO, TRY AGAIN.)?1
```

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```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                      TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),           TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                           TYPE 3
  FOR TUTORIAL                                                        TYPE 4
  TO EXIT,                                                            TYPE 0
?3
```

```
PLEASE TYPE IN YOUR HYPOTHETICAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y1 (DEPVAR)

PARAM: A1B1  MEAN VALUE= 5.65686            HYPO. VALUE=?0
PARAM: A2B1  MEAN VALUE= 4.08248            HYPO. VALUE=?0
PARAM: A1B2  MEAN VALUE=-7.13               HYPO. VALUE=?0
PARAM: A2B2  MEAN VALUE=-5.96723            HYPO. VALUE=?0

     TO CONTINUE                         TYPE 1?1
```

```
CADA IS COMPUTING THE PROBABILITY CONTENT OF THE SMALLEST
HDR (HIGHEST DENSITY REGION) CONTAINING YOUR HYPOTHETICAL
PARAMETER VALUE(S). --- PLEASE BE PATIENT!

          PROBABILITY CONTENT = 1.000

   TO SEE HYPOTHETICAL VALUES AGAIN                    TYPE 1
   TO COMPUTE PROBABILITY CONTENT OF ANOTHER HDR       TYPE 2
   TO EXIT FROM THIS MODULE (HDR)                      TYPE 0?0
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                      TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),           TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                           TYPE 3
  FOR TUTORIAL                                                        TYPE 4
  TO EXIT,                                                            TYPE 0
?0
```

```
        ANALYSIS OF REPEATED MEASURES DESIGNS

     1.   PUT DESCRIPTION OF LAYOUT OF EXPERIMENT ON FILE
     2.   PUT PRIOR INFORMATION ON FILE
     3.   PUT SUMMARY STATISTICS ON FILE
     4.   COMPUTE POSTERIOR DISTRIBUTION OF CELL MEANS
     5.   TRANSFORM CELL MEANS TO EFFECTS AND INTERACTIONS
     6.   EXAMINE MATRIC-T DISTRIBUTION OF PARAMETERS

     7.   TUTORIAL

     0.   EXIT

     TYPE IN YOUR CHOICE.?5
```

THE TRANSFORMED DISTRIBUTION IS NOW ON FILE.

```
     TO EXAMINE THIS DISTRIBUTION              TYPE 1
     TO REPLACE IT WITH A NEW TRANSFORMATION   TYPE 2
?2
```

YOU MAY NOW TELL CADA HOW YOU WANT TO DEFINE THE MAIN. EFFECTS OF EACH FACTOR. YOU HAVE THE OPTION OF ALLOWING CADA TO DEFINE THE MAIN EFFECTS -- EITHER SUCCESSIVE DIFFERENCES OR ORTHOGONAL POLYNOMIALS -- OR OF DEFINING YOUR OWN MAIN EFFECTS BY TYPING IN CONTRAST COEFFICIENTS.

YOU MAY ALSO CHOOSE TO USE ONE OR MORE FACTORS TO 'BREAK DOWN' THE ANALYSIS. IN OTHER WORDS, YOU MAY BREAK THE DATA INTO SUBSETS DEFINED BY LEVELS OF THE 'BREAKDOWN' FACTORS AND CALCULATE EFFECTS AND INTERACTIONS OF THE OTHER FACTORS SEPARATELY FOR EACH OF THESE SUBSETS.

YOUR OPTIONS FOR EACH FACTOR ARE:

1.CADA STANDARD EFFECTS -- SUCCESSIVE DIFFERENCES.
2.ORTHOGONAL POLYNOMIALS -- ASSUMING EQUAL SPACING.
3.USER-DEFINED EFFECTS -- CONTRASTS.

4.USE AS A BREAKDOWN FACTOR

```
     TO CONTINUE                         TYPE 1
     FOR TUTORIAL                        TYPE 2
?1
```

```
YOU WILL NOW BE SHOWN A LIST OF THE FACTORS. AFTER EACH
FACTOR TYPE 1,2,3 OR 4 TO INDICATE HOW THE FACTOR IS TO
BE USED IN THE ANALYSIS.

 1. FCTR A #LEVELS= 3

     OPTION (1=STANDARD, 2=ORTH POLS, 3=CONTRASTS; 4=BREAKDOWN)?4

 2. FCTR B #LEVELS= 3

     OPTION (1=STANDARD, 2=ORTH POLS, 3=CONTRASTS; 4=BREAKDOWN)?1
```

```
CADA IS NOW TRANSFORMING THE POSTERIOR DISTRIBUTION OF THE CELL
MEANS INTO THE POSTERIOR DISTRIBUTION OF THE MAIN EFFECTS AND
INTERACTIONS.  THIS CALCULATION MAY TAKE SEVERAL MINUTES,
SO PLEASE BE PATIENT.

WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
```

```
THE TRANSFORMED DISTRIBUTION IS NOW ON FILE.

     TO EXAMINE THIS DISTRIBUTION            TYPE 1
     TO REPLACE IT WITH A NEW TRANSFORMATION  TYPE 2
?1
```

```
MATRIC T DISTRIBUTION

(CALCULATING THE DETERMINANT OF THE RESIDUAL MATRIX.)
(PLEASE BE PATIENT --- THIS MAY TAKE A WHILE!)

     TO CONTINUE                           TYPE 1?1
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                   TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),        TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                        TYPE 3
  FOR TUTORIAL                                                     TYPE 4
  TO EXIT,                                                         TYPE 0
?1
```

```
MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
                           B. FCTR B
               BROKEN DOWN INTO CELLS BY FACTOR(S),
                           A. FCTR A

DEPENDENT VARIABLE, DEPVAR
```

ID#	CELL	EFFECT	STATUS	MEAN	STD. DEV.
1.	A1	MEAN	ACTIVE	+10.1111	+3.11836
2.	A1	B1	ACTIVE	+4.00000	+1.30931
3.	A1	B2	ACTIVE	+3.33333	+1.08269
4.	A2	MEAN	ACTIVE	+10.4667	+2.41547
5.	A2	B1	ACTIVE	+3.00000	+1.01418
6.	A2	B2	ACTIVE	+5.60000	+.838649
7.	A3	MEAN	ACTIVE	+12.0000	+2.70058
8.	A3	B1	ACTIVE	+12.0000	+1.13389
9.	A3	B2	ACTIVE	-6.75000	+.937638

```
     TO CONTINUE                                  TYPE 1?1
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                 TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),      TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                      TYPE 3
  FOR TUTORIAL                                                   TYPE 4
  TO EXIT,                                                       TYPE 0
?0
```

```
        ANALYSIS OF REPEATED MEASURES DESIGNS

    1.  PUT DESCRIPTION OF LAYOUT OF EXPERIMENT ON FILE
    2.  PUT PRIOR INFORMATION ON FILE
    3.  PUT SUMMARY STATISTICS ON FILE
    4.  COMPUTE POSTERIOR DISTRIBUTION OF CELL MEANS
    5.  TRANSFORM CELL MEANS TO EFFECTS AND INTERACTIONS
    6.  EXAMINE MATRIC-T DISTRIBUTION OF PARAMETERS

    7.  TUTORIAL

    0.  EXIT

    TYPE IN YOUR CHOICE.?0
```

```
51.  FULL-RANK MODEL I FACTORIAL ANALYSIS OF VARIANCE
52.  BAYESIAN ANALYSIS OF REPEATED-MEASURES DESIGNS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?0
```

```
     COMPONENT GROUPS

1.   DATA MANAGEMENT FACILITY
2.   SIMPLE BAYESIAN PARAMETRIC MODELS
3.   DECISION THEORETIC MODELS
4.   BAYESIAN SIMULTANEOUS ESTIMATION
5.   BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.   BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.   ELEMENTARY CLASSICAL STATISTICS
8.   EXPLORATORY DATA ANALYSIS
9.   PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?0
```

Component Group 6

THIS EXAMPLE FOLLOWS THE ANALYSIS IN WOODWORTH,G.G, 'BAYESIAN FULL RANK MANOVA/MANCOVA: AN INTERMEDIATE EXPOSISTION WITH INTERACTIVE COMPUTER EXAMPLES,' J. ED. STATIST., VOL. 4, NO. 4, PP 357-404.

THE NUMERICAL DIFFERENCES BETWEEN THE COMPUTER OUTPUT SHOWN IN THAT PAPER AND IN THIS LISTING HAVE TWO SOURCES, 1) THE DATA ANALYZED BY WOODWORTH CONTAINED A TYPOGRAPHICAL ERROR AND 2) THE PROGRAM HE USED INCORRECTLY COMPUTED THE F-APPROXIMATION TO WILK'S LAMBDA STATISTIC.

```
     COMPONENT GROUPS

1.   DATA MANAGEMENT FACILITY
2.   SIMPLE BAYESIAN PARAMETRIC MODELS
3.   DECISION THEORETIC MODELS
4.   BAYESIAN SIMULTANEOUS ESTIMATION
5.   BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.   BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.   ELEMENTARY CLASSICAL STATISTICS
8.   EXPLORATORY DATA ANALYSIS
9.   PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?1



COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12.  DATA MOVEMENT      ( INPUT/OUTPUT, EDITING )
13.  DATA TRANSFORMATIONS
14.  FILE MAINTENANCE  ( DATA GROUPING )

    * NOT YET AVAILABLE


TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?12
```

COMPONENT 12. DATA MOVEMENT

1. DATA ENTRY AND TRANSFERS
2. DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0')?1

MODEL 1. DATA ENTRY AND TRANSFERS

1. DATA ENTRY FROM THE TERMINAL
2. DATA TRANSFER FROM DISK
3. DATA TRANSFER FROM THE CATALOG

4. DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0')?3

THE DATA FILE CATALOG

1. ITBS SCORES, SCHOOL #1
2. ITBS SCORES, SCHOOL #14
3. ESAA PILOT PROGRAM
4. IOWA COUNTY DATA
5. SAMPLE REGRESSION DATA
6. SAMPLE ANOVA DATA
7. SAMPLE MANOVA DATA
8. JUNIOR COLLEGE ACT SCORES

IF YOU WANT AN AVAILABLE DATA SET, TYPE ITS NUMBER (ELSE '0').?7

TO TRANSFER THESE DATA TO YOUR WORK FILE, TYPE '1'.
TO OBTAIN A DESCRIPTION OF THESE DATA, TYPE '2'.?2

DATA SET #7 : SAMPLE MANOVA DATA

DATA SET 'M.BELL' CONTAINS SUMMARY STATISTICS FROM A COMMUNICATION EXPERIMENT (BELL,M.A., 'THE EFFECTS OF SUBSTANTIVE AND AFFECTIVE CONFLICT IN PROBLEM SOLVING GROUPS', SPEECH MONOGRAPHS, 1974, VOL 41, PP 19-24).

IN THAT EXPERIMENT EACH SUBJECT RESPONDED TO FIVE 'ROUNDS' OF COMPUTER-GENERATED STIMULUS MESSAGES. SUMMARY DATA FROM ROUNDS 1,3 AND 5 ARE ON THIS DATA FILE.

THE STIMULUS MESSAGES VARIED IN SUBSTANTIVE CONTENT (S-STIM) (LOW OR HIGH) AND IN NEGATIVE AFFECTIVE CONTENT (LOW OR HIGH). SUBJECTS WERE RANDOMLY ASSIGNED TO THE FOUR MESSAGE TYPES: (LOW,LOW), (LOW,HIGH), (HIGH, LOW) AND (HIGH,HIGH).

TO CONTINUE, TYPE '1'.?1

DATA SET #7 : SAMPLE MANOVA DATA

THUS THERE WERE TWO 'BETWEEN SUBJECTS' FACTORS :

FACTOR	NAME	# OF LEVELS
A. (SUBSTANTIVE CONTENT OF STIMULUS)	S-STIM	2
B. (AFFECTIVE CONTENT OF STIUMULS)	A-STIM	2

AND ONE 'WITHIN SUBJECTS' FACTOR :

FACTOR	NAME	# OF LEVELS
C.	ROUND	3

TO CONTINUE, TYPE '1'.?1

DATA SET #7 : SAMPLE MANOVA DATA

EACH OF A SUBJECTS THREE RESPONSE MESSAGES WAS SCORED ON THREE SCALES, SUBSTANTIVE, NEGATIVE AFFECTIVE AND META-DISCUSSIONAL. THUS THE DEPENDENT VARIABLES ARE :

VARIABLE	NAME
Y1. (SUBSTANTIVE CONTENT OF RESPONSE)	SUB
Y2. (AFFECTIVE CONTENT OF RESPONSE)	AFF
Y3. (METADISCUSSIONAL CONTENT OF RESPONSE)	META

FOR A MORE COMPLETE EXPLANATION OF THE TYPE OF SUMMARY STATISTICS STORED ON THIS DATA FILE, SELECT THE TUTORIAL SECTION OF THE MANOVA COMPONENT. TO SEE THE STATISTICS ON THIS FILE, SELECT THE 'MATRIC T' MODEL OF THAT COMPONENT AND ASK IT TO DISPLAY THE MEANS AND STANDARD DEVIATIONS.

IF YOU WANT TO USE THIS DATA SET, TYPE '1' (ELSE '0').?1

THE DATA SET IS NOW IN THE PERSONAL FILE. IT WILL REMAIN THERE UNTIL YOU SIGN OFF THE MONITOR OR REPLACE IT WITH ANOTHER DATA SET.

IF YOU WISH TO PROCEED TO AN ANALYSIS, TYPE '1'.
IF YOU WISH TO REMAIN IN DATA MANAGEMENT, TYPE '2'.?1

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?6

```
COMPONENT GROUP 6.  BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS

61.  BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS OF VARIANCE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?61


        MULTIVARIATE ANALYSIS OF VARIANCE

     1.  PUT DESCRIPTION OF LAYOUT OF EXPERIMENT ON FILE
     2.  PUT PRIOR INFORMATION ON FILE
     3.  PUT SUMMARY STATISTICS ON FILE
     4.  COMPUTE POSTERIOR DISTRIBUTION OF CELL MEANS
     5.  TRANSFORM CELL MEANS TO EFFECTS AND INTERACTIONS
     6.  EXAMINE MATRIC-T DISTRIBUTION OF PARAMETERS

     7.  TUTORIAL

     0.  EXIT

     TYPE IN YOUR CHOICE.?7


        TUTORIAL ON ANALYSIS OF EXPERIMENTAL DESIGNS

     1. FACTORS AND VARIABLES IN AN EXPERIMENTAL DESIGN
     2. FORMAT FOR RAW DATA.
     3. MULTIVARIATE SUMMARY STATISTICS
     4. PARAMETERS -- MAIN EFFECTS AND INTERACTIONS
     5. BREAKDOWNS ON A FACTOR
     6. POSTERIOR DISTRIBUTION -- CONDITIONING AND MARGINALIZATION
     7. HIGHEST DENSITY REGIONS.

     0. EXIT

IT IS RECOMMENDED THAT YOU READ THE TUTORIALS IN SEQUENCE
HOWEVER, YOU MAY WANT TO SAVE THE LATER TUTORIALS UNTIL
YOU REACH THE CORRESPONDING STAGES OF THE ANALYSIS.

ENTER YOUR CHOICE.?1
```

EXPERIMENTAL DESIGNS

A SUBJECT IN AN EXPERIMENT IS AN INDIVIDUAL PERSON, ANIMAL OR OBJECT ON WHICH ONE OR MORE MEASUREMENTS ARE MADE.

A DEPENDENT VARIABLE (SCALE OF MEASUREMENT) IS ANY QUANTITATIVE CHARACTERISTIC OF A SUBJECT WHICH IS MEASURED -- FOR EXAMPLE, SYSTOLIC BLOOD PRESSURE (SBP) OR GRADE POINT AVERAGE (GPA).

A FACTOR IS ANY CHARACTERISTIC OF THE SUBJECT OR ITS ENVIRONMENT WHICH IS USED TO DISTINGUISH ONE MEASUREMENT FROM ANOTHER.

FOR EXAMPLE, SUPPOSE THAT A COLLEGE WANTS TO COMPARE TWO DIFFERENT METHODS OF TEACHING 'GOOD STUDY HABITS' -- THE TWO METHODS ARE CALLED 'A1' AND 'A2'.

THE COLLEGE SELECTS 48 ENTERING STUDENTS AND RANDOMLY ASSIGNS 24 OF THEM TO METHOD A1 AND 24 OF THEM TO METHOD A2 WITH EQUAL NUMBERS OF MEN AND WOMEN UNDER EACH METHOD.

TO CONTINUE TYPE 1?1

(EXAMPLE, CONTINUED)

EACH STUDENT IS GIVEN AN APTITUDE TEST AT THE END OF HIS(HER) FIRST AND SECOND YEARS OF STUDY. THE APTITUDE TEST SCORE (ATS) AND GRADE POINT AVERAGE ARE RECORDED BOTH YEARS FOR EACH STUDENT IN THE STUDY. THE STUDENT'S SEX IS ALSO NOTED.

THERE ARE THREE FACTORS IN THIS STUDY, FACTORS A, B AND C.

FACTOR A: TEACHING METHOD (A1 OR A2)
FACTOR B: SEX OF STUDENT (B1=MALE B2=FEMALE)
FACTOR C: YEAR (C1=FIRST YEAR C2=SECOND YEAR)

A TYPICAL SUBJECT'S DATA WILL HAVE THE FOLLOWING FORMAT,

METHOD	SEX	YEAR	ATS	GPA
1	1	1	26	3.5
1	1	2	31	3.9

THIS MALE SUBJECT WAS TAUGHT BY METHOD A1 AND HAD ATS=26 AND GPA=3.5 THE FIRST YEAR AND ATS=31 AND GPA=3.9 THE SECOND.

TO CONTINUE TYPE 1?1

BETWEEN SUBJECTS FACTORS

A BETWEEN SUBJECTS FACTOR IS EITHER A CHARACTERISTIC SUCH AS SEX WHICH SERVES TO SEPARATE SUBJECTS INTO DISTINCT, NON-OVERLAPPING GROUPS (MALES, FEMALES) OR IS AN EXPERIMENTAL MANIPULATION SUCH AS TEACHING METHOD WHICH THE INVESTIGATIOR APPLIES IN DIFFERENT WAYS TO DISTINCT GROUPS OF SUBJECTS -- ONE GROUP OF 48 RECEIVED METHOD A1 ANOTHER, DIFFERENT GROUP OF 48 RECEIVED MENTHOD A2.

EACH SUBJECT APPEARS UNDER EXACTLY ONE LEVEL OF ANY BETWEEN SUBJECTS FACTOR -- A PERSON IS EITHER MALE OR FEMALE BUT NOT BOTH. A STUDENT IS TAUGHT BY METHOD A1 OR BY METHOD A2 BUT NOT BOTH.

TO CONTINUE TYPE 1?1

WITHIN SUBJECTS FACTORS

A WITHIN SUBJECTS FACTOR IS EITHER A SET OF TIMES AT WHICH MEASUREMENTS ARE MADE -- IN THIS EXAMPLE, AT THE ENDS OF YEARS 1 AND 2 OF COLLEGE-- OR IT IS AN EXPERIMENTAL MANIPULATION WHICH IS APPLIED AT DIFFERENT LEVELS TO THE THE SAME SUBJECT AT DIFFERENT TIMES. FOR EXAMPLE, THE INVESTIGATOR COULD HAVE TAUGHT EACH SUBJECT USING BOTH TEACHING METHODS -- METHOD A1 ONE YEAR AND METHOD A2 THE OTHER.

EACH SUBJECT APPERS UNDER ALL LEVELS OF ANY WITHIN SUBJECTS FACTOR -- HERE FOR EXAMPLE, EACH STUDENT IS MEASURED IN YEAR 1 (LEVEL C1 OF FACTOR C) AND ALSO IN YEAR 2 (LEVEL C2).

TO CONTINUE TYPE 1?1

TUTORIAL ON ANALYSIS OF EXPERIMENTAL DESIGNS

1. FACTORS AND VARIABLES IN AN EXPERIMENTAL DESIGN
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7. HIGHEST DENSITY REGIONS.

0. EXIT

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ENTER YOUR CHOICE.?2

FORMAT OF RAW DATA

IF THIS MANOVA COMPONENT IS ASKED TO PROCESS RAW DATA IT EXPECTS TO FIND IT ON THE USER'S PERSONAL FILE --- PLACED THERE BY THE DATA MANAGEMENT COMPONENT GROUP.

ON THE PERSONAL FILE THE DATA MAY BE GROUPED OR UNGROUPED. FOR EXAMPLE, THE DATA COULD BE ENTERED IN TWO GROUPS: MALES AND FEMALES OR THE DATA COULD BE ENTERED AS ONE GROUP WITH THE SUBJECT'S SEX INDICATED BY A CODED VARIABLE.

IF THE DATA ARE NOT GROUPED BY A FACTOR, THEN THAT FACTOR MUST APPEAR AS A VARIABLE IN THE DATA SET AND THE LEVELS OF THAT FACTOR MUST BE CODED AS SUCCESSIVE WHOLE NUMBERS BEGINNING WITH 1. IF THE FICTITIOUS DATA DESCRIBED IN PART 1 WERE ENTERED AS UNGROUPED DATA, HERE IS HOW IT WOULD LOOK,

TO CONTINUE TYPE 1?1

UNGROUPED DATA

			VARIABLES		
OBS.	1=METHOD	2=SEX	3=YEAR	4=ATS	5=GPA
1.	1	1	1	27	3.5
2.	1	1	2	31	3.9
... AND SO ON FOR THE 11 OTHER MALES UNDER METHOD A1 ...					
25.	1	2	1	30	3.9
26.	1	2	2	32	4.0
... AND SO ON FOR THE 11 OTHER FEMALES UNDER METHOD A1 ...					
49.	2	1	1	20	2.5
50.	2	1	2	22	2.8
... AND SO ON FOR THE 11 OTHER MALES UNDER METHOD A2 ...					
73.	2	2	1	25	3.1
74.	2	2	2	24	3.0
... AND SO ON FOR THE 11 OTHER FEMALES UNDER METHOD A2 ...					

NOTE THAT THERE ARE TWO LINES OF DATA ('OBSERVATIONS') FOR EACH SUBJECT AND THAT THE LINES OF DATA FOR EACH SUBJECT MUST (!!) BE TOGETHER.

TO CONTINUE TYPE 1?1

GROUPED DATA

IF THE DATA ARE GROUPED BY SEX OR BY METHOD OR BY BOTH SEX AND METHOD, THEN IT IS NOT NECESSARY THAT THE GROUPING FACTORS APPEAR AS VARIABLES. THIS IS PARTICULARLY USEFUL IF THE NUMBER OF DEPENDENT VARIABLES PLUS FACTORS EXCEEDS 5 -- THE MAXIMUM NUMBER OF VARIABLES CADA CAN STORE.

FOR EXAMPLE, IF THERE WERE 4 DEPENDENT VARIABLES, ENGLISH,MATH AND SCIENCE APTITUDE SCORES AND GPA, THEN THE DATA WOULD HAVE TO BE ENTERED IN FOUR GROUPS: MALES UNDER TREATMENT A1 FEMALES UNDER A1, MALES UNDER A2 AND FEMALES UNDER A2.

THERE WOULD BE 5 VARIABLES: YEAR, ENGLISH, MATH, SCIENCE AND GPA. EACH SUBJECT WOULD HAVE 2 LINES OF DATA.

SINCE DATA FOR EACH SUBJECT MUST BE TOGETHER, THE DATA CANNOT BE GROUPED BY WITHIN SUBJECTS FACTORS.

TO CONTINUE TYPE 1?1

GROUPED DATA (CONTINUED)

WHEN CADA DETECTS GROUPED DATA IT WILL ASK THE USER HOW MANY FACTORS WERE USED TO BREAK THE DATA INTO GROUPS AND HOW MANY LEVELS EACH FACTOR HAS. CADA WILL THEN LIST THE VARIOUS COMBINATIONS OF THESE LEVELS AND ASK THE USER TO SAY WHICH DATA GROUP HAD THAT COMBINATION. FOR EXAMPLE, WITH GROUPS,

```
GROUP 1 : MEN UNDER METHOD A1
GROUP 2 : WOMEN UNDER METHOD A2
GROUP 3 : WOMEN UNDER METHOD A1
GROUP 4 : MEN UNDER METHOD A2
```

THE USER SHOULD RESPOND THAT 2 FACTORS WERE USED TO BREAK THE DATA INTO GROUPS -- METHOD (FACTOR A) AND SEX (FACTOR B) -- THAT EACH FACTOR HAS 2 LEVELS AND THAT,

```
A1B1 = (METHOD A1, MEN)    = GROUP1
A1B2 = (METHOD A1, WOMEN)  = GROUP3
A2B1 = (METHOD A2, MEN)    = GROUP4
A2B2 = (METHOD A2, WOMEN)  = GROUP2

TO CONTINUE                          TYPE 1?1
```

TUTORIAL ON ANALYSIS OF EXPERIMENTAL DESIGNS

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0. EXIT

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ENTER YOUR CHOICE.?3

MULTIVARIATE SUMMARY STATISTICS

IN THE EXAMPLE INTRODUCED IN PART 1 OF THIS TUTORIAL THERE WERE THREE FACTORS, A (METHOD), B (SEX) AND C (YEAR), EACH AT TWO LEVELS (A1=METHOD 1, A2=METHOD 2), (B1=MALE, B2=FEMALE) (C1=YEAR1, C2=YEAR2). THERE WERE TWO DEPENDENT VARIABLES, Y1=APTITUDE TEST SCORE (ATS) AND Y2=GRADE POINT AVERAGE (GPA).

FACTORS A AND B ARE BETWEEN SUBJECTS AND FACTOR C IS WITHIN SUBJECTS. FOUR MEASUREMENTS WERE MADE ON EACH SUBJECT, FIRST AND SECOND YEAR ATS AND FIRST AND SECOND YEAR GPA.

TO OBTAIN SUMMARY STATISTICS, THE SUBJECTS ARE FIRST ARRANGED INTO THE FOUR GROUPS DETERMIND BY THE BETWEEN SUBJECTS FACTORS. THE GROUPS ARE LABELLED, 'A1B1, A1B2, A2B1 AND A2B2'. FOR EXAMPLE, GROUP A1B2 CONSISTS OF WOMEN (B2) TAUGHT BY METHOD 1 (A1)

TO CONTINUE TYPE 1?1

(SUMMARY STATISTICS, CONTINUED)

SUMMARY STATISTICS ARE THEN CALCULATED, THESE ARE

* THE NUMBERS OF SUBJECTS IN EACH OF THE 4 GROUPS
* THE MEANS OF THE 4 MEASUREMENTS IN EACH OF THE 4 GROUPS
* THE RESIDUAL OR ERROR MATRIX, E

THINK OF THE MEANS AS BEING LAID OUT IN A 'BETWEEN X WITHIN TABLE,

		WITHIN SUBJECTS			
		C1Y1	C2Y1	C1Y2	C2Y2
	A1B1	XX.X	XX.X	X.XX	X.XX
BETWEEN	A1B2	XX.X	XX.X	X.XX	X.XX
SUBJECTS	A2B1	XX.X	XX.X	X.XX	X.XX
	A2B2	XX.X	XX.X	X.XX	X.XX

KEY: A1=METHOD 1, A2=METHOD 2; B1=MALES, B2=FEMALES
C1=YEAR 1, C2=YEAR 2 ; Y1=ATS, Y2=GPA

TO CONTINUE TYPE 1?1

(SUMMARY STATISTICS, CONTINUED)

THE RESIDUAL OR ERROR MATRIX IS OBTAINED BY CALCULATING THE DEVIATION OF EACH OBSERVATION FROM ITS GROUP MEAN -- THERE WILL BE 4 DEVIATIONS FOR EACH SUBJECT.

THE SQUARES AND CROSS-PRODUCTS OF THESE DEVIATIONS ARE THEN TOTALLED FOR ALL THE SUBJECTS. THE RESULTS CAN BE THOUGHT OF AS LAID OUT IN A TRIANGULAR ARRAY WITH ROWS AND COLUMNS CORRESPONDING TO THE 4 MEASUREMENTS,

```
C1Y1 ! XXXXX.XX
C2Y1 ! XXXXX.XX  XXXXX.XX
C1Y2 !  XXXX.XX   XXXX.XX     XX.XX
C2Y2 !  XXXX.XX   XXXX.XX     XX.XX      XX.XX
-----+---------------------------------------
     !    C1Y1      C2Y1       C1Y2       C2Y2
```

C1=YEAR1, C2=YEAR2; Y1=ATS, Y2=GPA

TO CONTINUE TYPE 1?1

(SUMMARY STATISTICS, CONTINUED)

THE PRECISE TERM FOR THIS MATRIX IS 'THE POOLED, WITHIN-GROUPS SUM OF SQUARES AND PRODUCTS MATRIX'.

IN PUBLICATIONS, THIS MATRIX IS USUALLY CONVERTED INTO POOLED, WITHIN GROUPS STANDARD DEVIATIONS (SOMETIMES INCORRECTLY CALLED 'STANDARD ERRORS') AND POOLED, WITHIN GROUPS CORRELATIONS. FOR EXAMPLE, THE STANDARD DEVIATION OF THE YEAR 1 GPA (C1Y1) IS THE SQUARE ROOT OF THE ENTRY AT THE INTERSECTION OF ROW C1Y2 AND AND COLUMN C1Y2 DIVIDED BY THE 'DEGREES OF FREEDOM FOR ERROR' (NUMBER OF SUBJECTS MINUS NUMBER OF GROUPS).

THE CORRELATION BETWEEN YEAR 1 GPA AND YEAR 2 ATS IS THE ENTRY IN ROW 2, COLUMN 3 DIVIDED BY THE SQUARE ROOT OF THE PRODUCT OF THE 2ND AND 3RD ENTRIES IN THE DIAGONAL.

IF THE USER ELECTS TO TYPE IN SUMMARY STATISTICS, RATHER THAN RAW DATA, CADA EXPECTS THE E MATRIX IN THE FORM OF STANDARD DEVIATIONS AND CORRELATIONS.

TO CONTINUE TYPE 1?1

SAVING SUMMARY STATISTICS

THE MANOVA COMPONENT CREATES A DATA SET CONTAINING THE SUMMARY STATISTICS AND WRITES IT ON YOUR PERSONAL FILE. AFTER YOU FINISH OR INTERRUPT YOUR MANOVA, YOU MAY SELECT THE DATA MANAGEMENT COMPONENT GROUP AND FOLLOW ITS INSTRUCTIONS FOR WRITING THIS DATA SET ON A PERMANENT FILE.

IF YOU WANT TO RE-ANALYZE THE DATA YOU MAY USE THE DATA MANAGEMENT COMPONENT TO TRANSFER IT BACK FROM PERMANENT FILE TO YOUR PERSONAL FILE.

IN ORDER TO SAVE DATA ON A PERMANENT FILE YOU WILL NEED A FILE PASSWORD FOR EACH DATA SET TO BE SAVED.

TO CONTINUE TYPE 1?1

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0. EXIT

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ENTER YOUR CHOICE.?4

MAIN EFFECTS -- COMBINATIONS OF CELL MEANS

IN THE EXAMPLE INTRODUCED IN PART 1 OF THIS TUTORIAL THERE WERE TWO BETWEEN SUBJECTS FACTORS, A AND B, ONE WITHIN SUBJECTS FACTOR, C AND TWO DEPENDENT VARIABLES, Y1 AND Y2. FACTORS A AND B HAVE TWO LEVELS EACH AND WE WILL NOW SUPPOSE THAT FACTOR C (YEAR) HAS 3 LEVELS.

THERE ARE 12 COMBINATIONS OF LEVELS OF THE THREE FACTORS. THESE ARE CALLED 'CELLS' IN THE DESIGN. FOR EXAMPLE A2B1C3 IS THE CELL CONTAINING THE DATA AT LEVEL 2 OF FACTOR A LEVEL 1 OF FACTOR B AND LEVEL 3 OF FACTOR C.

THE POPULATION MEAN OF VARIABLE Y1 IN CELL A2B1C3 IS LABELLED MU(A2B1C3 Y1) AND OTHER CELL MEANS HAVE SIMILAR LABELS. OTHER PARAMETERS ARE DEFINED AS MEANS OF MEANS. FOR EXAMPLE, MU(B2C1 Y1) IS THE AVERAGE OF MU(A1B2C1 Y1) AND MU(A2B2C1 Y1) MU(B2 Y1) IS THE AVERAGE OF SIX MEANS OF THE FORM MU(AIB2CK Y1).

TO CONTINUE TYPE 1?1

MAIN EFFECTS CREATED BY CADA

CADA 'STANDARD' MAIN EFFECTS ARE DEFINED AS DIFFERENCES AMONG MEANS AT ADJACENT LEVELS OF A FACTOR. A THREE-LEVEL FACTOR LIKE C WILL HAVE TWO MAIN EFFECTS ON VARIABLE Y1 AND TWO MAIN EFFECTS ON VARIABLE Y2. THE TWO MAIN EFFECTS ON Y1 ARE,

E:B1(Y1) = MU(B2 Y1) - MU(B1 Y1)

AND

E:B2(Y1) = MU(B3 Y1) - MU(B2 Y1) .

IN OTHER WORDS, THE DIFFERENCE BETWEEN THE MEAN RESPONSES AT LEVELS B2 AND B1 AND THE DIFFERENCE BETWEEN THE MEANS AT LEVELS B3 AND B2.

(NOTE THAT THE SAME LABELS ARE USED FOR FACTOR LEVELS, AND FOR EFFECTS. FOR EXAMPLE, DEPENDING UPON CONTEXT, C1 COULD BE LEVEL 1 OF FACTOR C OR THE FIRST MAIN EFFECT OF THAT FACTOR. ON THE PRINTED PAGE, GREEK LETTERS ARE USED AS EFFECT SYMBOLS. FOR EXAMPLE, E:C2(Y1) WOULD BE WRITTEN, 'GAMMA-SUB2(Y-SUB1).)

TO CONTINUE TYPE 1?1

ORTHOGONAL POLYNOMIAL EFFECTS

THE USER MAY ASK CADA TO DEFINE THE MAIN EFFECTS OF A FACTOR AS ORTHOGONAL POLYNOMIALS (POLYNOMIAL TREND COMPONENTS). FOR AN COMPLETE EXPLANATION, SEE ANY TEXT ON DESIGN AND ANALYSIS OF EXPERIMENTS.

FOR EXAMPLE THE LINEAR AND QUADRATIC EFFECTS OF FACTOR C ON VARIABLE Y1 ARE,

```
LINEAR = .7071*MU(C3 Y1) - .7071*MU(C1 Y1)
QUAD.  = .4082*MU(C3 Y1) - .8164*MU(C2 Y1) + .4082*MU(C1 Y1)
```

THE LINEAR EFFECT IS PROPORTIONAL TO THE MEAN CHANGE IN Y1 BETWEEN YEARS 1 AND 3 AND THE QUADRATIC EFFECT IS PROPORTINAL TO THE DEVIATION OF YEAR 2 FROM THE STRAIGHT LINE CONNECTING THE Y1-SCORES FOR YEARS 1 AND 3. THE CONTRAST COEFFICIENTS ARE 'NORMALIZED'---THEIR SQUARES SUM TO 1.

TO CONTINUE TYPE 1?1

MAIN EFFECTS CREATED BY THE USER

USER-DEFINED MAIN EFFECTS ARE SPECIFIED AS CONTRASTS AMONG MEAN RESPONSES AT THE LEVELS OF A FACTOR. THUS A THREE LEVEL FACTOR LIKE C WILL REQUIRE TWO CONTRASTS.

FOR EXAMPLE, IF LEVEL C1 IS A 'CONTROL' THE USER MIGHT SELECT DEVIATIONS FROM THE CONTROL AS THE MAIN EFFECTS:

```
    E:C1 = C2 VS CONTROL = MU(C2) - MU(C1)
 AND
    E:C2 = C3 VS CONTROL = MU(C3) - MU(C1)
```

CADA WOULD ASK THE USER TO TYPE THE CONTRAST COEFFICIENTS,

LEVELS OF FACTOR C	CONTRAST COEFFICIENTS	
	C2 VS CTRL	C3 VS CTRL
C1	-1	-1
C2	1	0
C3	0	1

TO CONTINUE TYPE 1?1

INTERACTIONS -- 'PRODUCTS' OF MAIN EFFECTS

CADA CREATES INTERACTION EFFECTS FROM THE MAIN EFFECTS SPECIFIED BY THE USER OR CREATED BY CADA.

DEFINITIONS OF INTERACTIONS CAN BE DEDUCED BY FORMING THE SYMBOLIC 'PRODUCT' OF THE MAIN EFFECTS IN THE INTERACTION.

TO CONTINUE TYPE 1?1

SYMBOLIC PRODUCTS OF MAIN EFFECTS

FOR EXAMPLE, SUPPOSE THAT FACTOR B HAD 2 LEVELS AND FACTOR C HAD 3 LEVELS. ASSUME THAT THE USER ASKED FOR CADA STANDARD MAIN EFFECTS FOR FACTOR B AND TYPED UNSTANDARDIZED LINEAR AND QUADRATIC POLYNOMIAL EFFECTS AS THE MAIN EFFECTS OF FACTOR C. THE INTERACTION OF E:B1 AND E:C2, FOR EXAMPLE, IS DEDUCED AS FOLLOWS,

```
  E:B1 = MU(B2) - MU(B1)
  E:C2 = MU(C3) - 2*MU(C2) + MU(C1)
```

THE SYMBOLIC PRODUCT IS,

```
     (B2 - B1) X (C1 - 2*C2 + C3)
         = B2C1 - 2*B2C2 + B2C3 - B1C1 + 2*B1C2 - B1C3
```

THUS THE INTERACTION EFFECT, E:B1C2, IS,

```
     MU(B2C1) - 2*MU(B2C2) + MU(B2C3)
       -MU(B1C1) + 2*MU(B1C2) - MU(B1C3)
```

TO CONTINUE TYPE 1?1

BREAKDOWN FACTORS

SUPPOSE THE USER WANTED TO ANALYZE DATA FOR MEN AND WOMEN SEPARATELY. THIS CAN BE DONE BY USING FACTOR B (SEX) AS A BREAKDOWN FACTOR.

THIS CAUSES CADA TO DEFINE A SET OF MAIN EFFECTS AND INTERACTIONS OF THE OTHER FACTORS FOR EACH LEVEL OF FACTOR B. FOR EXAMPLE, THERE WILL BE A MAIN EFFECT OF FACTOR A (METHOD) ON VARIABLE Y1 FOR MEN (B1) AND ALSO A MAIN EFFECT FOR WOMEN (B2),

```
  MAIN EFFECT OF A ON Y1 FOR B1:
    E:A1(B1 Y1) = MU(A1B1 Y1) - MU(A2B1 Y1)
  MAIN EFFECT OF A ON Y1 FOR B2:
    E:A1(B2 Y1) = MU(A1B2 Y1) - MU(A2B2 Y1) .
```

THE ERROR MATRIX (SEE PART 3 OF THE TUTORIAL) IS NOT BROKEN DOWN. IN OTHER WORDS IT IS ASSUMED THAT THE BREAKDOWN GROUPS ARE HOMOSKEDASTIC -- STANDARD DEVIATIONS AND CORRELATIONS OF MEASUREMENTS ARE THE SAME FOR MEN AND WOMEN.

TO CONTINUE TYPE 1?1

(BREAKDOWN FACTORS, CONTINUED)

NOTE:

* THE ANALYSIS CAN BE BROKEN DOWN BY ANY COMBINATION OF BETWEEN OR WITHIN SUBJECTS FACTORS.

* THE ANALYSIS IS ALWAYS BROKEN DOWN BY DEPENDENT VARIABLES.

* IF ALL FACTORS ARE BREAKDOWN FACTORS, THEN THE PARAMETERS ARE THE CELL MEANS.

TO CONTINUE TYPE 1?1

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0. EXIT

IT IS RECOMMENDED THAT YOU READ THE TUTORIALS IN SEQUENCE HOWEVER, YOU MAY WANT TO SAVE THE LATER TUTORIALS UNTIL YOU REACH THE CORRESPONDING STAGES OF THE ANALYSIS.

ENTER YOUR CHOICE.?6

POSTERIOR DISTRIBUTION OF THE PARAMETERS

IN THE EXAMPLE OF PART 1 OF THIS TUTORIAL, THERE WERE TWO BETWEEN SUBJECTS FACTORS, A AND B, AT TWO LEVELS ONE WITHIN SUBJECTS FACTOR, C, AT TWO LEVELS AND TWO DEPENDENT VARIABLES, Y1 AND Y2.

ASSUMING NO BREAKDOWN FACTORS, THE PARAMETERS ARE,

VARIABLE Y1	VARIABLE Y2	NAME OF PARAMETER
MU(Y1)	MU(Y2)	(OVERALL MEAN)
A1(Y1)	A1(Y2)	(MAIN EFFECT OF A)
B1(Y1)	B1(Y2)	(MAIN EFFECT OF B)
C1(Y1)	C1(Y2)	(MAIN EFFECT OF C)
A1B1(Y1)	A1B1(Y1)	(A BY B INTERACTION)
A1C1(Y1)	A1C1(Y2)	(A BY C INTERACTION)
B1C1(Y1)	B1C1(Y2)	(B BY C INTERACTION)
A1B1C1(Y1)	A1B1C1(Y2)	(A BY B BY C INTERACTION)

TO CONTINUE TYPE 1?1

THINK OF THE PARAMETERS AS BEING ARRANGED IN THE

'BETWEEN BY WITHIN' PARAMETER TABLE,

	1	2	3	4	NAME
1	MU(Y1)	C1(Y1)	MU(Y2)	C1(Y2)	MU
2	A1(Y1)	A1C1(Y1)	A1(Y2)	A1C1(Y2)	A1
3	B1(Y1)	B1C1(Y1)	A1(Y2)	A1C1(Y2)	B1
4	A1B1(Y1)	A1B1C1(Y1)	A1B1(Y2)	A1B1C1(Y2)	A1B1
NAME:	MU(Y1)	C1(Y1)	MU(Y2)	C1(Y2)	

EACH ROW IN THIS TABLE HAS A NAME CONSISTING OF THE BETWEEN EFFECTS COMMON TO THE ROW; FOR EXAMPLE, EVERY PARAMETER IN ROW 2 CONTAINS 'A1'; EVERY PARAMETER IN ROW 4 CONTAINS 'A1B1'.

ROW 1 CONTAINS NO BETWEEN EFFECTS AND ITS NAME, 'MU' IS AN ARBITRARY CONVENTION.

EACH COLUMN HAS A NAME DETERMINED BY THE WITHIN EFFECTS AND DEPENDENT VARIABLES COMMON TO IT.

TO CONTINUE TYPE 1?1

(POSTERIOR DISTRIBUTION, CONTINUED)

THE POSTERIOR DISTRIBUTION OF THESE PARAMETERS, ASSUMING A NON-INFORMATIVE OR INFORMATIVE-CONJUGATE PRIOR DISTRIBUTION, IS A 'MATRIC-T' DISTRIBUTION. FOR MORE INFORMATION ON THIS DISTRIBUTION SEE THE BOOK, 'BAYESIAN INFERENCE IN STATISTICAL ANALYSIS' BY GEORGE E.P.BOX AND GEORGE C. TIAO., PP 441-453.

IN STUDYING THE POSTERIOR DISTRIBUTION OF THE PARAMETERS, THE USER WILL PROBABLY WANT TO EXAMINE CONDITIONAL AND MARGINAL DISTRIBUTIONS OF SUBSETS OF PARAMETERS.

IN THEORY, ANY PATTERN OF CONDITIONING AND MARGINALIZATION IS POSSIBLE; HOWEVER, CONDITIONAL AND MARGINAL DISTRIBUTIONS HAVE BEEN DERIVED ONLY FOR CERTAIN, RESTRICTED PATTERNS OF CONDITIONALIZATION AND MARGINALIZATION.

TO CONTINUE TYPE 1?1

RULES FOR CONDITIONING AND MARGINALIZATION

1. WHEN THE MARGINALIZED PARAMETERS ARE DELETED FROM THE PARAMETER TABLE, THOSE REMAINING MUST FORM A RECTANGLE.

2. IF BOTH THE MARGINALIZED AND THE CONDITIONED PARAMETERS ARE DELETED, THOSE REMAINING MUST STILL FORM A RECTANGLE.

HERE IS AN EXAMPLE,

	1	2	3	4	! NAME
1 !	MARG	MARG	MARG	MARG	! MU
2 !	A1(Y1)	A1C1(Y1)	MARG	MARG	! A1
3 !	B1(Y1)	B1C1(Y1)	MARG	MARG	! B1
4 !	COND	COND	MARG	MARG	! A1B1
NAME:	(Y1)	C1(Y1)	(Y2)	C1(Y2)	

TO CONTINUE TYPE 1?1

	1	2	3	4	! NAME
1 !	MARG	MARG	MARG	MARG	! MU
2 !	A1(Y1)	A1C1(Y1)	MARG	MARG	! A1
3 !	B1(Y1)	B1C1(Y1)	MARG	MARG	! B1
4 !	COND	COND	MARG	MARG	! A1B1
NAME:	(Y1)	C1(Y1)	(Y2)	C1(Y2)	

IF THE USER MARGINALIZES ANY PARAMETERS, RULE 1 REQUIRES THAT ENTIRE ROWS AND OR COLUMNS OF THE PARAMETER TABLE BE MARGINALIZED. WITH THE MARGINALIZED PARAMETERS DELETED, RULE 2 REQUIRES THAT IF ANY OF THE REMAINING PARAMETERS IS CONDITIONED, THEN ENTIRE ROWS AND OR COLUMNS MUST BE.

CADA ENFORCES THE RULES BY PRESENTING THE ROW- AND COLUMN NAMES TO THE USER AND ASKING WHICH ARE TO BE MARGINALIZED AND WHICH ARE TO BE CONDITIONED.

TO CONTINUE TYPE 1?1

TUTORIAL ON ANALYSIS OF EXPERIMENTAL DESIGNS

1. FACTORS AND VARIABLES IN AN EXPERIMENTAL DESIGN
2. FORMAT FOR RAW DATA.
3. MULTIVARIATE SUMMARY STATISTICS
4. PARAMETERS -- MAIN EFFECTS AND INTERACTIONS
5. BREAKDOWNS ON A FACTOR
6. POSTERIOR DISTRIBUTION -- CONDITIONING AND MARGINALIZATION
7. HIGHEST DENSITY REGIONS.

0. EXIT

IT IS RECOMMENDED THAT YOU READ THE TUTORIALS IN SEQUENCE HOWEVER, YOU MAY WANT TO SAVE THE LATER TUTORIALS UNTIL YOU REACH THE CORRESPONDING STAGES OF THE ANALYSIS.

ENTER YOUR CHOICE.?7

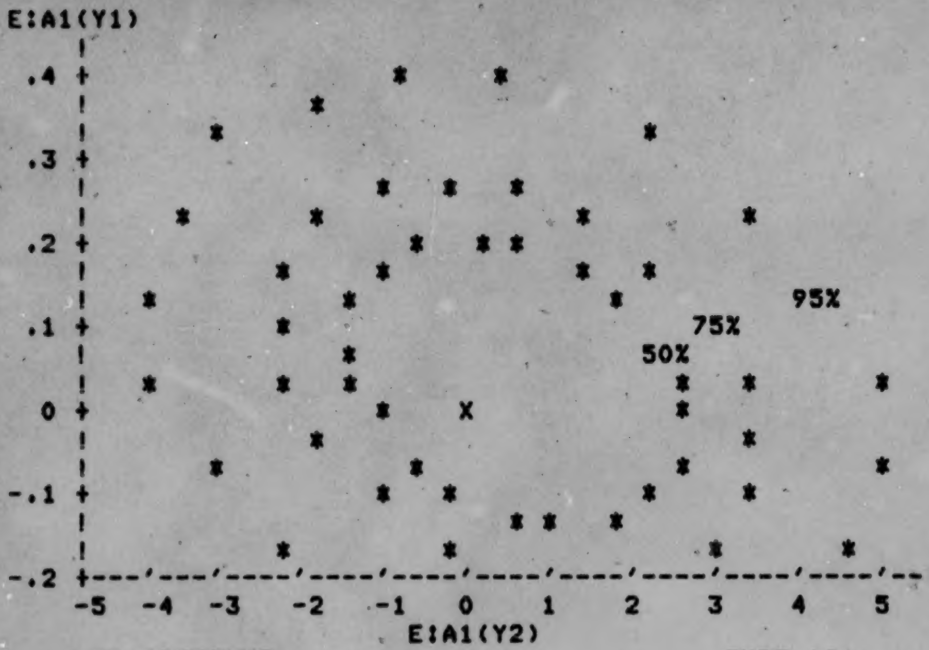
HIGHEST DENSITY REGIONS

SUPPOSE THAT IN THE EXAMPLE OF PART 1 OF THIS TUTORIAL YOU WANT TO EXAMINE THE MARGINAL DISTRIBUTION OF THE MAIN EFFECTS OF FACTOR A (METHOD), E!A1(Y1) AND E!A1(Y2).

THE DISTRIBUTION OF THESE EFFECTS IS BIVARIATE T. SUPPOSE, FOR THE SAKE OF ILLUSTRATION, THAT THE POSTERIOR MEANS (ESTIMATES) OF THE EFFECTS ARE .05 AND .5 THE POSTERIOR STANDARD DEVIATIONS ARE .65 AND 6.0 AND THE CORRELATION BETWEEN THE EFFECTS IS -.40 .

SOME HIGHEST DENSITY REGIONS (HDR'S) OF THE JOINT DISTRIBUTION OF THESE EFFECTS ARE SHOWN IN THE NEXT FRAME. EACH HDR IS OUTLINED BY AN ELLIPSE LABELLED WITH ITS PROBABILITY CONTENT. THE POINT (0,0), WHICH REPRESENTS THE 'HYPOTHESISIS' THAT FACTOR A HAS NO EFFECT, IS SHOWN AS 'X'.

TO CONTINUE TYPE 1?1



TO CONTINUE TYPE 1?1

THE JOINT CREDIBILITY OF A SET OF HYPOTHESIZED VALUES IS THE INDICATED BY THE PROBABILITY CONTENT OF THE SMALLEST HDR CONTAINING THE VALUES IN QUESTION. THE SMALLER THIS PROBABILITY IS, THE MORE PLAUSIBLE IS THE SET OF HYPOTHESIZED VALUES.

IN THIS CASE, WE SAW THAT THE POINT (0,0) WAS INSIDE THE 50% HDR SO THAT IT IS QUITE PLAUSIBLE. ON THE OTHER HAND, THE POINT (.1,3) IS CLOSE TO THE EDGE OF THE 95% HDR AND SO IS SOMEWHAT IMPLAUSIBLE.

TO CONTINUE TYPE 1?1

TUTORIAL ON ANALYSIS OF EXPERIMENTAL DESIGNS

1. FACTORS AND VARIABLES IN AN EXPERIMENTAL DESIGN
2. FORMAT FOR RAW DATA.
3. MULTIVARIATE SUMMARY STATISTICS
4. PARAMETERS -- MAIN EFFECTS AND INTERACTIONS
5. BREAKDOWNS ON A FACTOR
6. POSTERIOR DISTRIBUTION -- CONDITIONING AND MARGINALIZATION
7. HIGHEST DENSITY REGIONS.

0. EXIT

IT IS RECOMMENDED THAT YOU READ THE TUTORIALS IN SEQUENCE HOWEVER, YOU MAY WANT TO SAVE THE LATER TUTORIALS UNTIL YOU REACH THE CORRESPONDING STAGES OF THE ANALYSIS.

ENTER YOUR CHOICE.?0

MULTIVARIATE ANALYSIS OF VARIANCE

1. PUT DESCRIPTION OF LAYOUT OF EXPERIMENT ON FILE
2. PUT PRIOR INFORMATION ON FILE
3. PUT SUMMARY STATISTICS ON FILE
4. COMPUTE POSTERIOR DISTRIBUTION OF CELL MEANS
5. TRANSFORM CELL MEANS TO EFFECTS AND INTERACTIONS
6. EXAMINE MATRIC-T DISTRIBUTION OF PARAMETERS

7. TUTORIAL

0. EXIT

TYPE IN YOUR CHOICE.?1

```
THERE IS A DATA SET NAMED M.BELL ON YOUR PERSONAL FILE.
THIS DATA SET ALREADY CONTAINS A DESCRIPTION OF
THE LAYOUT OF AN EXPERIMENT (OR SURVEY).

   IF YOU INTEND TO USE THIS LAYOUT           TYPE 1
   IF YOU NEED TO REVIEW THE LAYOUT           TYPE 2
   IF THIS LAYOUT IS NOT TO BE USED           TYPE 3?2
```

```
HERE ARE THE FACTORS IN YOUR DESIGN:

BETWEEN SUBJECTS FACTORS:

ID#   FACTOR   IDENTIFYING    NUMBER OF
       NAME      LETTER        LEVELS
---------------------------------------
 1    S-STIM       A              2
 2    A-STIM       B              2

WITHIN SUBJECTS FACTORS:

ID#   FACTOR   IDENTIFYING    NUMBER OF
       NAME      LETTER        LEVELS
---------------------------------------
 3    ROUND        C              3

AND HERE ARE THE  3    DEPENDENT VARIABLES,

 1. SUB      2. AFF      3. META

    TO CONTINUE                          TYPE 1?1
```

```
IF YOU INTEND TO USE THIS LAYOUT           TYPE 1
IF YOU NEED TO REVIEW THE LAYOUT           TYPE 2
IF THIS LAYOUT IS NOT TO BE USED           TYPE 3?1
```

```
    MULTIVARIATE ANALYSIS OF VARIANCE

 1.  PUT DESCRIPTION OF LAYOUT OF EXPERIMENT ON FILE
 2.  PUT PRIOR INFORMATION ON FILE
 3.  PUT SUMMARY STATISTICS ON FILE
 4.  COMPUTE POSTERIOR DISTRIBUTION OF CELL MEANS
 5.  TRANSFORM CELL MEANS TO EFFECTS AND INTERACTIONS
 6.  EXAMINE MATRIC-T DISTRIBUTION OF PARAMETERS

 7.  TUTORIAL

 0.  EXIT

 TYPE IN YOUR CHOICE.?2
```

PRIOR DISTRIBUTION

1. NON-INFORMATIVE PRIOR
2. INFORMATIVE, CONJUGATE PRIOR

OPTION?1

MULTIVARIATE ANALYSIS OF VARIANCE

1. PUT DESCRIPTION OF LAYOUT OF EXPERIMENT ON FILE
2. PUT PRIOR INFORMATION ON FILE
3. PUT SUMMARY STATISTICS ON FILE
4. COMPUTE POSTERIOR DISTRIBUTION OF CELL MEANS
5. TRANSFORM CELL MEANS TO EFFECTS AND INTERACTIONS
6. EXAMINE MATRIC-T DISTRIBUTION OF PARAMETERS

7. TUTORIAL

0. EXIT

TYPE IN YOUR CHOICE.?3

SUMMARY STATISTICS

1. FROM RAW (OR SUMMARY) DATA ON FILE
2. ENTER AT THE TERMINAL
OPTION?1

SUMMARY DATA HAVE BEEN PUT ON FILE.

TO CONTINUE TYPE 1?1

MULTIVARIATE ANALYSIS OF VARIANCE

```
1.  PUT DESCRIPTION OF LAYOUT OF EXPERIMENT ON FILE
2.  PUT PRIOR INFORMATION ON FILE
3.  PUT SUMMARY STATISTICS ON FILE
4.  COMPUTE POSTERIOR DISTRIBUTION OF CELL MEANS
5.  TRANSFORM CELL MEANS TO EFFECTS AND INTERACTIONS
6.  EXAMINE MATRIC-T DISTRIBUTION OF PARAMETERS

7.  TUTORIAL

0.  EXIT

TYPE IN YOUR CHOICE.?4
```

POSTERIOR DISTRIBUTION

```
THERE IS NO PRIOR INFORMATION ON FILE AT THIS TIME.
YOU MAY, OF COURSE, ANALYZE THE DATA USING A NON-INFORMATIVE
PRIOR.  HOWEVER, IF YOU WANT TO USE AN INFORMATIVE PRIOR
YOU MUST EXIT AND SELECT MODEL 2.

     TO COMPUTE POSTERIOR FOR NON-INFORMATIVE PRIOR  TYPE 1
     TO EXIT                                         TYPE 0

?1
```

THE POSTERIOR DISTRIBUTION IS NOW ON FILE.

TO CONTINUE TYPE 1?1

MULTIVARIATE ANALYSIS OF VARIANCE

1. PUT DESCRIPTION OF LAYOUT OF EXPERIMENT ON FILE
2. PUT PRIOR INFORMATION ON FILE
3. PUT SUMMARY STATISTICS ON FILE
4. COMPUTE POSTERIOR DISTRIBUTION OF CELL MEANS
5. TRANSFORM CELL MEANS TO EFFECTS AND INTERACTIONS
6. EXAMINE MATRIC-T DISTRIBUTION OF PARAMETERS

7. TUTORIAL

0. EXIT

TYPE IN YOUR CHOICE.?6

MATRIC T DISTRIBUTION

(CALCULATING THE DETERMINANT OF THE RESIDUAL MATRIX.)
(PLEASE BE PATIENT --- THIS MAY TAKE A WHILE!)

TO CONTINUE TYPE 1?1

THE POSTERIOR MATRIC T DISTRIBUTION OF THE CELL MEANS
IS READY FOR EXAMINATION.

TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,	TYPE 1
TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),	TYPE 2
TO COMPUTE PROBABILITY CONTENT OF AN HDR,	TYPE 3
FOR TUTORIAL	TYPE 4
TO EXIT,	TYPE 0

?1

MEANS AND STANDARD DEVIATIONS BROKEN DOWN INTO CELLS BY FACTOR(S),
A. S-STIM B. A-STIM C. ROUND

DEPENDENT VARIABLE, SUB

ID#	CELL	STATUS	MEAN	STD. DEV.
1.	A1B1C1	ACTIVE	+4.22000	+.812777
2.	A1B1C2	ACTIVE	+3.52000	+.721648
3.	A1B1C3	ACTIVE	+2.58000	+.736425
4.	A1B2C1	ACTIVE	+5.37000	+.768810
5.	A1B2C2	ACTIVE	+3.86000	+.682610
6.	A1B2C3	ACTIVE	+4.06000	+.696589
7.	A2B1C1	ACTIVE	+5.88000	+.837792
8.	A2B1C2	ACTIVE	+4.69000	+.743857
9.	A2B1C3	ACTIVE	+5.19000	+.759090
10.	A2B2C1	ACTIVE	+5.41000	+.789877
11.	A2B2C2	ACTIVE	+4.67000	+.701315
12.	A2B2C3	ACTIVE	+4.84000	+.715677

TO CONTINUE TYPE 1?1

MEANS AND STANDARD DEVIATIONS BROKEN DOWN INTO CELLS BY FACTOR(S),
A. S-STIM B. A-STIM C. ROUND

DEPENDENT VARIABLE, AFF

ID#	CELL	STATUS	MEAN	STD. DEV.
1.	A1B1C1	ACTIVE	+2.18000	+.366981
2.	A1B1C2	ACTIVE	+1.99000	+.534463
3.	A1B1C3	ACTIVE	+3.24000	+.470426
4.	A1B2C1	ACTIVE	+3.74000	+.347129
5.	A1B2C2	ACTIVE	+4.71000	+.505551
6.	A1B2C3	ACTIVE	+5.39000	+.444978
7.	A2B1C1	ACTIVE	+2.54000	+.378276
8.	A2B1C2	ACTIVE	+3.19000	+.550911
9.	A2B1C3	ACTIVE	+3.41000	+.484904
10.	A2B2C1	ACTIVE	+2.52000	+.356642
11.	A2B2C2	ACTIVE	+4.28000	+.519404
12.	A2B2C3	ACTIVE	+4.41000	+.457171

TO CONTINUE TYPE 1?1

MEANS AND STANDARD DEVIATIONS BROKEN DOWN INTO CELLS BY FACTOR(S),
A. S-STIM B. A-STIM C. ROUND

DEPENDENT VARIABLE, META

ID#	CELL	STATUS	MEAN	STD. DEV.
1.	A1B1C1	ACTIVE	+2.01000	+.349741
2.	A1B1C2	ACTIVE	+2.56000	+.586185
3.	A1B1C3	ACTIVE	+3.88000	+.546777
4.	A1B2C1	ACTIVE	+3.00000	+.330821
5.	A1B2C2	ACTIVE	+4.80000	+.554475
6.	A1B2C3	ACTIVE	+3.90000	+.517200
7.	A2B1C1	ACTIVE	+2.36000	+.360504
8.	A2B1C2	ACTIVE	+3.13000	+.604225
9.	A2B1C3	ACTIVE	+3.37000	+.563605
10.	A2B2C1	ACTIVE	+3.68000	+.339887
11.	A2B2C2	ACTIVE	+2.89000	+.569669
12.	A2B2C3	ACTIVE	+3.68000	+.531372

TO CONTINUE TYPE 1?1

THE POSTERIOR MATRIC T DISTRIBUTION OF THE CELL MEANS
IS READY FOR EXAMINATION.

TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS, TYPE 1
TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE), TYPE 2
TO COMPUTE PROBABILITY CONTENT OF AN HDR, TYPE 3
FOR TUTORIAL TYPE 4
TO EXIT, TYPE 0
?0

MULTIVARIATE ANALYSIS OF VARIANCE

1. PUT DESCRIPTION OF LAYOUT OF EXPERIMENT ON FILE
2. PUT PRIOR INFORMATION ON FILE
3. PUT SUMMARY STATISTICS ON FILE
4. COMPUTE POSTERIOR DISTRIBUTION OF CELL MEANS
5. TRANSFORM CELL MEANS TO EFFECTS AND INTERACTIONS
6. EXAMINE MATRIC-T DISTRIBUTION OF PARAMETERS

7. TUTORIAL

0. EXIT

TYPE IN YOUR CHOICE.?5

YOU MAY NOW TELL CADA HOW YOU WANT TO DEFINE THE MAIN. EFFECTS OF EACH FACTOR. YOU HAVE THE OPTION OF ALLOWING CADA TO DEFINE THE MAIN EFFECTS -- EITHER SUCCESSIVE DIFFERENCES OR ORTHOGONAL POLYNOMIALS -- OR OF DEFINING YOUR OWN MAIN EFFECTS BY TYPING IN CONTRAST COEFFICIENTS.

YOU MAY ALSO CHOOSE TO USE ONE OR MORE FACTORS TO 'BREAK DOWN' THE ANALYSIS. IN OTHER WORDS, YOU MAY BREAK THE DATA INTO SUBSETS DEFINED BY LEVELS OF THE 'BREAKDOWN' FACTORS AND CALCULATE EFFECTS AND INTERACTIONS OF THE OTHER FACTORS SEPARATELY FOR EACH OF THESE SUBSETS.

YOUR OPTIONS FOR EACH FACTOR ARE:

1.CADA STANDARD EFFECTS -- SUCCESSIVE DIFFERENCES.
2.ORTHOGONAL POLYNOMIALS -- ASSUMING EQUAL SPACING.
3.USER-DEFINED EFFECTS -- CONTRASTS.

4.USE AS A BREAKDOWN FACTOR

TO CONTINUE	TYPE 1
FOR TUTORIAL	TYPE 2

?1

```
YOU WILL NOW BE SHOWN A LIST OF THE FACTORS. AFTER EACH
FACTOR TYPE 1,2,3 OR 4 TO INDICATE HOW THE FACTOR IS TO
BE USED IN THE ANALYSIS.

 1. S-STIM #LEVELS= 2

     OPTION (1=STANDARD, 2=ORTH POLS, 3=CONTRASTS; 4=BREAKDOWN)?1

 2. A-STIM #LEVELS= 2

     OPTION (1=STANDARD, 2=ORTH POLS, 3=CONTRASTS; 4=BREAKDOWN)?1

 3. ROUND  #LEVELS= 3

     OPTION (1=STANDARD, 2=ORTH POLS, 3=CONTRASTS; 4=BREAKDOWN)?2

CADA IS NOW TRANSFORMING THE POSTERIOR DISTRIBUTION OF THE CELL
MEANS INTO THE POSTERIOR DISTRIBUTION OF THE MAIN EFFECTS AND
INTERACTIONS.  THIS CALCULATION MAY TAKE SEVERAL MINUTES,
SO PLEASE BE PATIENT.

WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
WORKING ...
```

THE TRANSFORMED DISTRIBUTION IS NOW ON FILE.

```
     TO EXAMINE THIS DISTRIBUTION                TYPE 1
     TO REPLACE IT WITH A NEW TRANSFORMATION     TYPE 2
?1
```

MATRIC T DISTRIBUTION

(CALCULATING THE DETERMINANT OF THE RESIDUAL MATRIX.)
(PLEASE BE PATIENT --- THIS MAY TAKE A WHILE!)

```
     TO CONTINUE                               TYPE 1?1
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                    TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),         TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                         TYPE 3
  FOR TUTORIAL                                                      TYPE 4
  TO EXIT,                                                          TYPE 0
?1
```

```
MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
                A. S-STIM   B. A-STIM   C. ROUND

DEPENDENT VARIABLE, SUB
```

ID#	EFFECT	STATUS	MEAN	STD. DEV.
1.	MEAN	ACTIVE	+4.52417	+.253910
2.	A1	ACTIVE	+1.17833	+.507821
3.	B1	ACTIVE	+.355000	+.507821
4.	C1	ACTIVE	-.744230	+.283042
5.	C2	ACTIVE	+.415392	+.383157
6.	A1B1	ACTIVE	-1.27000	+1.01564
7.	A1C1	ACTIVE	+.597505	+.566084
8.	B1C1	ACTIVE	+.159100	+.566084
9.	A1C2	ACTIVE	+.230660	+.766315
10.	B1C2	ACTIVE	+.238825	+.766315
11.	A1B1C1	ACTIVE	-.148493	+1.13217
12.	A1B1C2	ACTIVE	-1.11452	+1.53263

```
    TO CONTINUE                              TYPE 1?1
```

MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
A. S-STIM B. A-STIM C. ROUND

DEPENDENT VARIABLE, AFF

ID#	EFFECT	STATUS	MEAN	STD. DEV.
1.	MEAN	ACTIVE	+3.46667	+.163048
2.	A1	ACTIVE	-.150000	+.326095
3.	B1	ACTIVE	+1.41667	+.326095
4.	C1	ACTIVE	+.966969	+.189610
5.	C2	ACTIVE	-.092876	+.201887
6.	A1B1	ACTIVE	-1.45333	+.652191
7.	A1C1	ACTIVE	+.017677	+.379219
8.	B1C1	ACTIVE	+.569221	+.379219
9.	A1C2	ACTIVE	-.655238	+.403773
10.	B1C2	ACTIVE	-.598083	+.403773
11.	A1B1C1	ACTIVE	+.304056	+.758438
12.	A1B1C2	ACTIVE	+.216372	+.807547

TO CONTINUE TYPE 1?1

MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
A. S-STIM B. A-STIM C. ROUND

DEPENDENT VARIABLE, META

ID#	EFFECT	STATUS	MEAN	STD. DEV.
1.	MEAN	ACTIVE	+3.27167	+.167813
2.	A1	ACTIVE	-.173334	+.335627
3.	B1	ACTIVE	+.773333	+.335627
4.	C1	ACTIVE	+.668216	+.216755
5.	C2	ACTIVE	-.089815	+.234643
6.	A1B1	ACTIVE	-.620001	+.671254
7.	A1C1	ACTIVE	-.622254	+.433510
8.	B1C1	ACTIVE	-.700036	+.433510
9.	A1C2	ACTIVE	+.608290	+.469285
10.	B1C2	ACTIVE	-.277609	+.469285
11.	A1B1C1	ACTIVE	-.028284	+.867019
12.	A1B1C2	ACTIVE	+2.27803	+.938571

TO CONTINUE TYPE 1?1

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                      TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),          TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                           TYPE 3
  FOR TUTORIAL                                                        TYPE 4
  TO EXIT,                                                            TYPE 0
?2
```

```
    ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE)

  TO REMOVE ALL CONDITIONS AND MARGINALIZATIONS,   TYPE 1
  TO ADD CONDITIONS AND/OR MARGINALIZATIONS,       TYPE 2
  TO EXIT,                                         TYPE 0
?2
```

ASSIGN PARAMETER STATUS

YOU MAY NOW SAY HOW YOU WANT EACH PARAMETER TO BE TREATED IN THIS STAGE OF YOUR ANALYSIS. FOR EACH PARAMETER YOU MAY,

1. KEEP PARAMETER IN THE ANALYSIS -- LEARN SOMETHING ABOUT IT
2. CONDITIONALIZE THE PARAMETER -- SET IT TO A KNOWN VALUE.
3. MARGINALIZE THE PARAMETER -- IGNORE IT FOR THE MOMENT.

THE PATTERN OF CONDITIONING AND MARGINALIZING CANNOT BE TOTALLY ARBITRARY BUT MUST FOLLOW CERTAIN RULES -- BRIEFLY, YOU MUST MARGINALIZE OR CONDITIONALIZE ENTIRE ROWS AND OR COLUMNS OF THE 'PARAMETER TABLE'. FOR MORE DETAILS, EXIT AND SELECT THE TUTORIAL.

TO CONTINUE TYPE 1
TO EXIT TYPE 0?1

CURRENT STATUS OF PARAMETERS

	1 +	2 +	3 +	4 +	5 +	6 +	7 +	8 +	9 +
1+	A	A	A	A	A	A	A	A	A
2+	A	A	A	A	A	A	A	A	A
3+	A	A	A	A	A	A	A	A	A
4+	A	A	A	A	A	A	A	A	A

ROWS: 1.MU 2.A1 3.B1 4.A1B1

COLS: 1.MU(Y1) 2.C1(Y1) 3.C2(Y1) 4.MU(Y2) 5.C1(Y2) 6.C2(Y2) 7.MU(Y3) 8.C1(Y3) 9.C2(Y3)

KEY: ROWS=BETWEEN, COLS=WITHIN, A=ACTIVE, *=CONDITIONED, MU=MEAN

TO CONTINUE TYPE 1?1

```
STATUS OF ROWS OF PARAMETER TABLE
-----------------------------------------
ROW  1.  NAME: MU   NEW STATUS (1=KEEP 2=COND 3=MARG): ?3
ROW  2.  NAME: A1   NEW STATUS (1=KEEP 2=COND 3=MARG): ?3
ROW  3.  NAME: B1   NEW STATUS (1=KEEP 2=COND 3=MARG): ?3
ROW  4.  NAME: A1B1  NEW STATUS (1=KEEP 2=COND 3=MARG): ?1
```

```
STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y1 (SUB   )

-----------------------------------------
COL  1.  NAME: MU( Y1)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL  2.  NAME: C1( Y1)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
COL  3.  NAME: C2( Y1)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
```

```
STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y2 (AFF    )

-----------------------------------------
COL  4.  NAME: MU( Y2)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL  5.  NAME: C1( Y2)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
COL  6.  NAME: C2( Y2)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
```

```
STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y3 (META   )

-----------------------------------------
COL  7.  NAME: MU( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL  8.  NAME: C1( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
COL  9.  NAME: C2( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
```

```
CURRENT STATUS OF PARAMETERS

          1  2  3  4  5  6  7  8  9
          +  +  +  +  +  +  +  +  +
    1+
    2+
    3+
    4+       A  A     A  A     A  A

ROWS:   1.MU    2.A1    3.B1    4.A1B1

COLS:   1.MU( Y1)   2.C1( Y1)   3.C2( Y1)   4.MU( Y2)   5.C1( Y2)
        6.C2( Y2)   7.MU( Y3)   8.C1( Y3)   9.C2( Y3)

KEY:  ROWS=BETWEEN, COLS=WITHIN, A=ACTIVE, *=CONDITIONED, MU=MEAN

  IS THIS WHAT YOU WANTED? (1=YES.  2=NO, TRY AGAIN.)?1




THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                   TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),        TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                        TYPE 3
  FOR TUTORIAL                                                     TYPE 4
  TO EXIT,                                                         TYPE 0
?3
```

```
PLEAS_ TYPE IN YOUR HYPOTHETICAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y1 (SUB    )

PARAM: A1B1C1( Y1)  MEAN VALUE=-.148493         HYPO. VALUE=?0
PARAM: A1B1C2( Y1)  MEAN VALUE=-1.11452         HYPO. VALUE=?0

    TO CONTINUE                                TYPE 1?1
```

```
HYPOTHETICAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y2 (AFF    )

PARAM: A1B1C1( Y2)  MEAN VALUE= .304056         HYPO. VALUE=?0
PARAM: A1B1C2( Y2)  MEAN VALUE= .216372         HYPO. VALUE=?0

    TO CONTINUE                                TYPE 1?1
```

HYPOTHETICAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y3 (META)

PARAM: A1B1C1(Y3) MEAN VALUE=-2.82836E-02 HYPO. VALUE=?0
PARAM: A1B1C2(Y3) MEAN VALUE= 2.27803 HYPO. VALUE=?0

TO CONTINUE TYPE 1?1

```
CADA IS COMPUTING THE PROBABILITY CONTENT OF THE SMALLEST
HDR (HIGHEST DENSITY REGION) CONTAINING YOUR HYPOTHETICAL
PARAMETER VALUE(S). --- PLEASE BE PATIENT!

          PROBABILITY CONTENT = 0.647

     TO SEE HYPOTHETICAL VALUES AGAIN                      TYPE 1
     TO COMPUTE PROBABILITY CONTENT OF ANOTHER HDR         TYPE 2
     TO EXIT FROM THIS MODULE (HDR)                        TYPE 0?1
```

```
HYPOTHETICAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y1 (SUB    )

PARAM: A1B1C1( Y1)  MEAN VALUE=-.148493          HYPO. VALUE= 0
PARAM: A1B1C2( Y1)  MEAN VALUE=-1.11452          HYPO. VALUE= 0

     TO CONTINUE                             TYPE 1?1
```

HYPOTHETICAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y2 (AFF)

PARAM: A1B1C1(Y2)	MEAN VALUE= .304056	HYPO. VALUE= 0
PARAM: A1B1C2(Y2)	MEAN VALUE= .216372	HYPO. VALUE= 0

TO CONTINUE TYPE 1?1

HYPOTHETICAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y3 (META)

PARAM: A1B1C1(Y3)	MEAN VALUE=-2.82836E-02	HYPO. VALUE= 0
PARAM: A1B1C2(Y3)	MEAN VALUE= 2.27803	HYPO. VALUE= 0

TO CONTINUE TYPE 1?1

```
TO SEE HYPOTHETICAL VALUES AGAIN                  TYPE 1
TO COMPUTE PROBABILITY CONTENT OF ANOTHER HDR     TYPE 2
TO EXIT FROM THIS MODULE (HDR)                    TYPE 0?0
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                    TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),  TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                         TYPE 3
  FOR TUTORIAL                                                      TYPE 4
  TO EXIT,                                                          TYPE 0
?2
```

ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE)

```
TO REMOVE ALL CONDITIONS AND MARGINALIZATIONS,   TYPE 1
TO ADD CONDITIONS AND/OR MARGINALIZATIONS,       TYPE 2
TO EXIT,                                         TYPE 0
?1
```

MATRIC T DISTRIBUTION

```
(CALCULATING THE DETERMINANT OF THE RESIDUAL MATRIX.)
(PLEASE BE PATIENT --- THIS MAY TAKE A WHILE!)

    TO CONTINUE                              TYPE 1?1
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                     TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),          TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                          TYPE 3
  FOR TUTORIAL                                                       TYPE 4
  TO EXIT,                                                           TYPE 0
?2
```

```
    ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE)

  TO REMOVE ALL CONDITIONS AND MARGINALIZATIONS,    TYPE 1
  TO ADD CONDITIONS AND/OR MARGINALIZATIONS,        TYPE 2
  TO EXIT,                                          TYPE 0
?2
```

ASSIGN PARAMETER STATUS

YOU MAY NOW SAY HOW YOU WANT EACH PARAMETER TO BE TREATED IN THIS STAGE OF YOUR ANALYSIS. FOR EACH PARAMETER YOU MAY,

1. KEEP PARAMETER IN THE ANALYSIS -- LEARN SOMETHING ABOUT IT
2. CONDITIONALIZE THE PARAMETER -- SET IT TO A KNOWN VALUE.
3. MARGINALIZE THE PARAMETER -- IGNORE IT FOR THE MOMENT.

THE PATTERN OF CONDITIONING AND MARGINALIZING CANNOT BE TOTALLY ARBITRARY BUT MUST FOLLOW CERTAIN RULES -- BRIEFLY, YOU MUST MARGINALIZE OR CONDITIONALIZE ENTIRE ROWS AND OR COLUMNS OF THE 'PARAMETER TABLE'. FOR MORE DETAILS, EXIT AND SELECT THE TUTORIAL.

TO CONTINUE TYPE 1
TO EXIT TYPE 0?1

CURRENT STATUS OF PARAMETERS

	1 +	2 +	3 +	4 +	5 +	6 +	7 +	8 +	9 +
1+	A	A	A	A	A	A	A	A	A
2+	A	A	A	A	A	A	A	A	A
3+	A	A	A	A	A	A	A	A	A
4+	A	A	A	A	A	A	A	A	A

ROWS: 1.MU 2.A1 3.B1 4.A1B1

COLS: 1.MU(Y1) 2.C1(Y1) 3.C2(Y1) 4.MU(Y2) 5.C1(Y2) 6.C2(Y2) 7.MU(Y3) 8.C1(Y3) 9.C2(Y3)

KEY: ROWS=BETWEEN, COLS=WITHIN, A=ACTIVE, *=CONDITIONED, MU=MEAN

TO CONTINUE TYPE 1?1

STATUS OF ROWS OF PARAMETER TABLE

```
-----------------------------------------
ROW  1.  NAME: MU   NEW STATUS (1=KEEP 2=COND 3=MARG): ?3
ROW  2.  NAME: A1   NEW STATUS (1=KEEP 2=COND 3=MARG): ?1
ROW  3.  NAME: B1   NEW STATUS (1=KEEP 2=COND 3=MARG): ?1
ROW  4.  NAME: A1B1  NEW STATUS (1=KEEP 2=COND 3=MARG): ?2
```

STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y1 (SUB   )

```
-----------------------------------------
COL  1.  NAME: MU( Y1)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL  2.  NAME: C1( Y1)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
COL  3.  NAME: C2( Y1)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
```

```
STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y2 (AFF    )

----------------------------------------
COL   4.   NAME: MU( Y2)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL   5.   NAME: C1( Y2)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
COL   6.   NAME: C2( Y2)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
```

```
STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y3 (META   )

----------------------------------------
COL   7.   NAME: MU( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL   8.   NAME: C1( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
COL   9.   NAME: C2( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
```

CURRENT STATUS OF PARAMETERS

```
            1  2  3  4  5  6  7  8  9
            +  +  +  +  +  +  +  +  +
         1+
         2+    A  A     A  A     A  A
         3+    A  A     A  A     A  A
         4+    *  *     *  *     *  *
```

ROWS: 1.MU 2.A1 3.B1 4.A1B1

COLS: 1.MU(Y1) 2.C1(Y1) 3.C2(Y1) 4.MU(Y2) 5.C1(Y2)
6.C2(Y2) 7.MU(Y3) 8.C1(Y3) 9.C2(Y3)

KEY: ROWS=BETWEEN, COLS=WITHIN, A=ACTIVE, *=CONDITIONED, MU=MEAN

IS THIS WHAT YOU WANTED? (1=YES. 2=NO, TRY AGAIN.)?1

PLEASE TYPE IN YOUR CONDITIONAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y1 (SUB)

PARAM: A1B1C1(Y1) MEAN VALUE=-.148493 COND. VALUE=?0
PARAM: A1B1C2(Y1) MEAN VALUE=-1.11452 COND. VALUE=?0

TO CONTINUE TYPE 1?1

```
CONDITIONAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y2 (AFF    )

PARAM: A1B1C1( Y2)  MEAN VALUE= .304056          COND. VALUE=?0
PARAM: A1B1C2( Y2)  MEAN VALUE= .216372          COND. VALUE=?0

     TO CONTINUE                                  TYPE 1?1
```

```
CONDITIONAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y3 (META   )

PARAM: A1B1C1( Y3)  MEAN VALUE=-2.82836E-02      COND. VALUE=?0
PARAM: A1B1C2( Y3)  MEAN VALUE= 2.27803          COND. VALUE=?0

     TO CONTINUE                                  TYPE 1?1
```

```
CADA IS COMPUTING THE CONDITIONAL DISTRIBUTION OF THE
PARAMETERS. --- PLEASE BE PATIENT!
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                   TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),  TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                        TYPE 3
  FOR TUTORIAL                                                     TYPE 4
  TO EXIT,                                                         TYPE 0
?1
```

```
MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
               A. S-STIM  B. A-STIM  C. ROUND

DEPENDENT VARIABLE, SUB

ID# EFFECT            STATUS    MEAN      STD. DEV.

 1. MEAN              MARG.
 2. A1                MARG.
 3. B1                MARG.
 4. C1                MARG.
 5. C2                MARG.
 6. A1B1              MARG.
 7. A1C1              ACTIVE +.593256   +.560867
 8. B1C1              ACTIVE +.161235   +.561556
 9. A1C2              ACTIVE +.198765   +.762281
10. B1C2              ACTIVE +.254851   +.763217
11. A1B1C1            COND.  +.000000
12. A1B1C2            COND.  +.000000

     TO CONTINUE                             TYPE 1?1
```

MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
A. S-STIM B. A-STIM C. ROUND

DEPENDENT VARIABLE, AFF

ID#	EFFECT	STATUS	MEAN	STD. DEV.
1.	MEAN	MARG.		
2.	A1	MARG.		
3.	B1	MARG.		
4.	C1	MARG.		
5.	C2	MARG.		
6.	A1B1	MARG.		
7.	A1C1	ACTIVE	+.026379	+.376145
8.	B1C1	ACTIVE	+.564849	+.376607
9.	A1C2	ACTIVE	-.649046	+.400223
10.	B1C2	ACTIVE	-.601195	+.400714
11.	A1B1C1	COND.	+.000000	
12.	A1B1C2	COND.	+.000000	

TO CONTINUE TYPE 1?1

MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
A. S-STIM B. A-STIM C. ROUND

DEPENDENT VARIABLE, META

ID#	EFFECT	STATUS	MEAN	STD. DEV.
1.	MEAN	MARG.		
2.	A1	MARG.		
3.	B1	MARG.		
4.	C1	MARG.		
5.	C2	MARG.		
6.	A1B1	MARG.		
7.	A1C1	ACTIVE	-.623064	+.429460
8.	B1C1	ACTIVE	-.699629	+.429988
9.	A1C2	ACTIVE	+.673483	+.485823
10.	B1C2	ACTIVE	-.310366	+.486420
11.	A1B1C1	COND.	+.000000	
12.	A1B1C2	COND.	+.000000	

TO CONTINUE TYPE 1?1

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                     TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),          TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                          TYPE 3
  FOR TUTORIAL                                                       TYPE 4
  TO EXIT,                                                           TYPE 0
?3
```

```
PLEASE TYPE IN YOUR HYPOTHETICAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y1 (SUB    )

PARAM: A1C1( Y1)     MEAN VALUE= .593256          HYPO. VALUE=?0
PARAM: B1C1( Y1)     MEAN VALUE= .161235          HYPO. VALUE=?0
PARAM: A1C2( Y1)     MEAN VALUE= .198765          HYPO. VALUE=?0
PARAM: B1C2( Y1)     MEAN VALUE= .254851          HYPO. VALUE=?0

     TO CONTINUE                                  TYPE 1?1
```

HYPOTHETICAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y2 (AFF   )

```
PARAM: A1C1( Y2)    MEAN VALUE= 2.63789E-02     HYPO. VALUE=?0
PARAM: B1C1( Y2)    MEAN VALUE= .564849         HYPO. VALUE=?0
PARAM: A1C2( Y2)    MEAN VALUE=-.649046         HYPO. VALUE=?0
PARAM: B1C2( Y2)    MEAN VALUE=-.601195         HYPO. VALUE=?0

     TO CONTINUE                              TYPE 1?1
```

HYPOTHETICAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y3 (META   )

```
PARAM: A1C1( Y3)    MEAN VALUE=-.623064         HYPO. VALUE=?0
PARAM: B1C1( Y3)    MEAN VALUE=-.699629         HYPO. VALUE=?0
PARAM: A1C2( Y3)    MEAN VALUE= .673483         HYPO. VALUE=?0
PARAM: B1C2( Y3)    MEAN VALUE=-.310366         HYPO. VALUE=?0

     TO CONTINUE                              TYPE 1?1
```

```
CADA IS COMPUTING THE PROBABILITY CONTENT OF THE SMALLEST
HDR (HIGHEST DENSITY REGION) CONTAINING YOUR HYPOTHETICAL
PARAMETER VALUE(S). --- PLEASE BE PATIENT!

          PROBABILITY CONTENT = 0.782

   TO SEE HYPOTHETICAL VALUES AGAIN                       TYPE 1
   TO COMPUTE PROBABILITY CONTENT OF ANOTHER HDR          TYPE 2
   TO EXIT FROM THIS MODULE (HDR)                         TYPE 0?0
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),    TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                     TYPE 3
  FOR TUTORIAL                                                  TYPE 4
  TO EXIT,                                                      TYPE 0
?2
```

```
    ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE)

  TO REMOVE ALL CONDITIONS AND MARGINALIZATIONS,   TYPE 1
  TO ADD CONDITIONS AND/OR MARGINALIZATIONS,       TYPE 2
  TO EXIT,                                         TYPE 0
?1
```

```
MATRIC T DISTRIBUTION

(CALCULATING THE DETERMINANT OF THE RESIDUAL MATRIX.)
(PLEASE BE PATIENT --- THIS MAY TAKE A WHILE!)

     TO CONTINUE                                    TYPE 1?1
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,               TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),    TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                    TYPE 3
  FOR TUTORIAL                                                 TYPE 4
  TO EXIT,                                                     TYPE 0
?2
```

```
ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE)

 TO REMOVE ALL CONDITIONS AND MARGINALIZATIONS,   TYPE 1
 TO ADD CONDITIONS AND/OR MARGINALIZATIONS,       TYPE 2
 TO EXIT,                                         TYPE 0
?2
```

```
ASSIGN PARAMETER STATUS

YOU MAY NOW SAY HOW YOU WANT EACH PARAMETER TO BE TREATED IN
THIS STAGE OF YOUR ANALYSIS.  FOR EACH PARAMETER YOU MAY,

  1. KEEP PARAMETER IN THE ANALYSIS -- LEARN SOMETHING ABOUT IT
  2. CONDITIONALIZE THE PARAMETER -- SET IT TO A KNOWN VALUE.
  3. MARGINALIZE THE PARAMETER -- IGNORE IT FOR THE MOMENT.

THE PATTERN OF CONDITIONING AND MARGINALIZING CANNOT BE
TOTALLY ARBITRARY BUT MUST FOLLOW CERTAIN RULES -- BRIEFLY,
YOU MUST MARGINALIZE OR CONDITIONALIZE ENTIRE ROWS AND OR
COLUMNS OF THE 'PARAMETER TABLE'. FOR MORE DETAILS, EXIT
AND SELECT THE TUTORIAL.

    TO CONTINUE                                 TYPE 1
    TO EXIT                                     TYPE 0?1
```

CURRENT STATUS OF PARAMETERS

	1	2	3	4	5	6	7	8	9
	+	+	+	+	+	+	+	+	+
1+	A	A	A	A	A	A	A	A	A
2+	A	A	A	A	A	A	A	A	A
3+	A	A	A	A	A	A	A	A	A
4+	A	A	A	A	A	A	A	A	A

ROWS: 1.MU 2.A1 3.B1 4.A1B1

COLS: 1.MU(Y1) 2.C1(Y1) 3.C2(Y1) 4.MU(Y2) 5.C1(Y2)
6.C2(Y2) 7.MU(Y3) 8.C1(Y3) 9.C2(Y3)

KEY: ROWS=BETWEEN, COLS=WITHIN, A=ACTIVE, *=CONDITIONED, MU=MEAN

TO CONTINUE TYPE 1?1

STATUS OF ROWS OF PARAMETER TABLE

ROW 1. NAME: MU NEW STATUS (1=KEEP 2=COND 3=MARG): ?1
ROW 2. NAME: A1 NEW STATUS (1=KEEP 2=COND 3=MARG): ?2
ROW 3. NAME: B1 NEW STATUS (1=KEEP 2=COND 3=MARG): ?2
ROW 4. NAME: A1B1 NEW STATUS (1=KEEP 2=COND 3=MARG): ?2

```
STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y1 (SUB    )

----------------------------------------
COL  1.  NAME: MU( Y1)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL  2.  NAME: C1( Y1)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
COL  3.  NAME: C2( Y1)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
```

```
STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y2 (AFF    )

----------------------------------------
COL  4.  NAME: MU( Y2)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL  5.  NAME: C1( Y2)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
COL  6.  NAME: C2( Y2)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
```

```
STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y3 (META  )

----------------------------------------
COL  7.  NAME: MU( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL  8.  NAME: C1( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
COL  9.  NAME: C2( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
```

```
                    CURRENT STATUS OF PARAMETERS

                            1  2  3  4  5  6  7  8  9
                            +  +  +  +  +  +  +  +  +
                        1+     A  A     A  A     A  A
                        2+     *  *     *  *     *  *
                        3+     *  *     *  *     *  *
                        4+     *  *     *  *     *  *

ROWS:   1.MU   2.A1   3.B1   4.A1B1

COLS:   1.MU( Y1)   2.C1( Y1)   3.C2( Y1)   4.MU( Y2)   5.C1( Y2)
        6.C2( Y2)   7.MU( Y3)   8.C1( Y3)   9.C2( Y3)

KEY:  ROWS=BETWEEN, COLS=WITHIN, A=ACTIVE, *=CONDITIONED, MU=MEAN

  IS THIS WHAT YOU WANTED? (1=YES.  2=NO, TRY AGAIN.)?1
```

PLEASE TYPE IN YOUR CONDITIONAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y1 (SUB)

```
PARAM: A1C1( Y1)    MEAN VALUE= .597505       COND. VALUE=?0
PARAM: B1C1( Y1)    MEAN VALUE= .1591         COND. VALUE=?0
PARAM: A1C2( Y1)    MEAN VALUE= .23066        COND. VALUE=?0
PARAM: B1C2( Y1)    MEAN VALUE= .238825       COND. VALUE=?0
PARAM: A1B1C1( Y1)  MEAN VALUE=-.148493       COND. VALUE=?0
PARAM: A1B1C2( Y1)  MEAN VALUE=-1.11452       COND. VALUE=?0

     TO CONTINUE                            TYPE 1?1
```

CONDITIONAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y2 (AFF)

```
PARAM: A1C1( Y2)    MEAN VALUE= 1.76773E-02   COND. VALUE=?0
PARAM: B1C1( Y2)    MEAN VALUE= .569221       COND. VALUE=?0
PARAM: A1C2( Y2)    MEAN VALUE=-.655238       COND. VALUE=?0
PARAM: B1C2( Y2)    MEAN VALUE=-.598083       COND. VALUE=?0
PARAM: A1B1C1( Y2)  MEAN VALUE= .304056       COND. VALUE=?0
PARAM: A1B1C2( Y2)  MEAN VALUE= .216372       COND. VALUE=?0

     TO CONTINUE                            TYPE 1?1
```

```
CONDITIONAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y3 (META   )

PARAM: A1C1( Y3)     MEAN VALUE=-.622254        COND. VALUE=?0
PARAM: B1C1( Y3)     MEAN VALUE=-.700036        COND. VALUE=?0
PARAM: A1C2( Y3)     MEAN VALUE= .60829         COND. VALUE=?0
PARAM: B1C2( Y3)     MEAN VALUE=-.277609        COND. VALUE=?0
PARAM: A1B1C1( Y3)   MEAN VALUE=-2.82836E-02    COND. VALUE=?0
PARAM: A1B1C2( Y3)   MEAN VALUE= 2.27803        COND. VALUE=?0

     TO CONTINUE                              TYPE 1?1
```

```
CADA IS COMPUTING THE CONDITIONAL DISTRIBUTION OF THE
PARAMETERS. --- PLEASE BE PATIENT!
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                 TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),      TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                      TYPE 3
  FOR TUTORIAL                                                   TYPE 4
  TO EXIT,                                                       TYPE 0
?1
```

MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
A. S-STIM B. A-STIM C. ROUND

DEPENDENT VARIABLE, SUB

ID#	EFFECT	STATUS	MEAN	STD. DEV.
1.	MEAN	MARG.		
2.	A1	MARG.		
3.	B1	MARG.		
4.	C1	ACTIVE	-.748220	+.278645
5.	C2	ACTIVE	+.418921	+.375773
6.	A1B1	MARG.		
7.	A1C1	COND.	+.000000	
8.	B1C1	COND.	+.000000	
9.	A1C2	COND.	+.000000	
10.	B1C2	COND.	+.000000	
11.	A1B1C1	COND.	+.000000	
12.	A1B1C2	COND.	+.000000	

TO CONTINUE TYPE 1?1

MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
A. S-STIM B. A-STIM C. ROUND

DEPENDENT VARIABLE, AFF

ID#	EFFECT	STATUS	MEAN	STD. DEV.
1.	MEAN	MARG.		
2.	A1	MARG.		
3.	B1	MARG.		
4.	C1	ACTIVE	+.982980	+.188353
5.	C2	ACTIVE	-.100604	+.204296
6.	A1B1	MARG.		
7.	A1C1	COND.	+.000000	
8.	B1C1	COND.	+.000000	
9.	A1C2	COND.	+.000000	
10.	B1C2	COND.	+.000000	
11.	A1B1C1	COND.	+.000000	
12.	A1B1C2	COND.	+.000000	

TO CONTINUE TYPE 1?1

```
MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
                    A. S-STIM  B. A-STIM  C. ROUND

DEPENDENT VARIABLE, META

ID# EFFECT             STATUS    MEAN       STD. DEV.

  1. MEAN              MARG.
  2. A1                MARG.
  3. B1                MARG.
  4. C1                ACTIVE +.657104   +.219019
  5. C2                ACTIVE -.106436   +.243402
  6. A1B1              MARG.
  7. A1C1              COND.  +.000000
  8. B1C1              COND.  +.000000
  9. A1C2              COND.  +.000000
 10. B1C2              COND.  +.000000
 11. A1B1C1            COND.  +.000000
 12. A1B1C2            COND.  +.000000

    TO CONTINUE                                TYPE 1?1
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                     TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),          TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                          TYPE 3
  FOR TUTORIAL                                                       TYPE 4
  TO EXIT,                                                           TYPE 0
?2
```

```
ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE)

  TO REMOVE ALL CONDITIONS AND MARGINALIZATIONS,   TYPE 1
  TO ADD CONDITIONS AND/OR MARGINALIZATIONS,       TYPE 2
  TO EXIT,                                         TYPE 0
?2
```

```
     ASSIGN PARAMETER STATUS

YOU MAY NOW SAY HOW YOU WANT EACH PARAMETER TO BE TREATED IN
THIS STAGE OF YOUR ANALYSIS.  FOR EACH PARAMETER YOU MAY,

  1. KEEP PARAMETER IN THE ANALYSIS -- LEARN SOMETHING ABOUT IT
  2. CONDITIONALIZE THE PARAMETER -- SET IT TO A KNOWN VALUE.
  3. MARGINALIZE THE PARAMETER -- IGNORE IT FOR THE MOMENT.

THE PATTERN OF CONDITIONING AND MARGINALIZING CANNOT BE
TOTALLY ARBITRARY BUT MUST FOLLOW CERTAIN RULES -- BRIEFLY,
YOU MUST MARGINALIZE OR CONDITIONALIZE ENTIRE ROWS AND OR
COLUMNS OF THE 'PARAMETER TABLE'. FOR MORE DETAILS, EXIT
AND SELECT THE TUTORIAL.

     TO CONTINUE                              TYPE 1
     TO EXIT                                  TYPE 0?1
```

```
CURRENT STATUS OF PARAMETERS

          1  2  3  4  5  6  7  8  9
          +  +  +  +  +  +  +  +  +
     1+      A  A     A  A     A  A
     2+      *  *     *  *     *  *
     3+      *  *     *  *     *  *
     4+      *  *     *  *     *  *

ROWS:   1.MU   2.A1   3.B1   4.A1B1

COLS:   1.MU( Y1)   2.C1( Y1)   3.C2( Y1)   4.MU( Y2)   5.C1( Y2)
        6.C2( Y2)   7.MU( Y3)   8.C1( Y3)   9.C2( Y3)

KEY:  ROWS=BETWEEN, COLS=WITHIN, A=ACTIVE, *=CONDITIONED, MU=MEAN

     TO CONTINUE                              TYPE 1?1
```

```
STATUS OF ROWS OF PARAMETER TABLE
-----------------------------------------
ROW  1.  NAME: MU  NEW STATUS (1=KEEP 2=COND 3=MARG): ?1
```

```
STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y1 (SUB    )

----------------------------------------
COL  2.  NAME: C1( Y1)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL  3.  NAME: C2( Y1)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
```

```
STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y2 (AFF    )

----------------------------------------
COL  5.  NAME: C1( Y2)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL  6.  NAME: C2( Y2)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
```

```
STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y3 (META  )

----------------------------------------
COL  8.  NAME: C1( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL  9.  NAME: C2( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
```

```
                 CURRENT STATUS OF PARAMETERS

                    1  2  3  4  5  6  7  8  9
                    +  +  +  +  +  +  +  +  +
                 1+       A        A        A
                 2+       *        *        *
                 3+       *        *        *
                 4+       *        *        *

ROWS:   1.MU   2.A1   3.B1   4.A1B1

COLS:   1.MU( Y1)   2.C1( Y1)   3.C2( Y1)   4.MU( Y2)   5.C1( Y2)
        6.C2( Y2)   7.MU( Y3)   8.C1( Y3)   9.C2( Y3)

KEY:  ROWS=BETWEEN, COLS=WITHIN, A=ACTIVE, *=CONDITIONED, MU=MEAN

  IS THIS WHAT YOU WANTED? (1=YES.  2=NO, TRY AGAIN.)?1
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),     TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                     TYPE 3
  FOR TUTORIAL                                                  TYPE 4
  TO EXIT,                                                      TYPE 0
?3
```

```
PLEASE TYPE IN YOUR HYPOTHETICAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y1 (SUB    )

PARAM: C2( Y1)      MEAN VALUE= .418921        HYPO. VALUE=?0

     TO CONTINUE                             TYPE 1?1
```

HYPOTHETICAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y2 (AFF)

PARAM: C2(Y2) MEAN VALUE=-.100604 HYPO. VALUE=?0

TO CONTINUE TYPE 1?1

HYPOTHETICAL PARAMETER VALUES FOR
DEPENDENT VARIABLE Y3 (META)

PARAM: C2(Y3) MEAN VALUE=-.106436 HYPO. VALUE=?0

TO CONTINUE TYPE 1?1

570

```
CADA IS COMPUTING THE PROBABILITY CONTENT OF THE SMALLEST
HDR (HIGHEST DENSITY REGION) CONTAINING YOUR HYPOTHETICAL
PARAMETER VALUE(S). --- PLEASE BE PATIENT!

          PROBABILITY CONTENT = 0.302

   TO SEE HYPOTHETICAL VALUES AGAIN                  TYPE 1
   TO COMPUTE PROBABILITY CONTENT OF ANOTHER HDR     TYPE 2
   TO EXIT FROM THIS MODULE (HDR)                    TYPE 0?0
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                    TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),  TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                         TYPE 3
  FOR TUTORIAL                                                      TYPE 4
  TO EXIT,                                                          TYPE 0
?2
```

```
    ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE)

  TO REMOVE ALL CONDITIONS AND MARGINALIZATIONS,   TYPE 1
  TO ADD CONDITIONS AND/OR MARGINALIZATIONS,       TYPE 2
  TO EXIT,                                         TYPE 0
?1
```

```
MATRIC T DISTRIBUTION

(CALCULATING THE DETERMINANT OF THE RESIDUAL MATRIX.)
(PLEASE BE PATIENT --- THIS MAY TAKE A WHILE!)

   TO CONTINUE                                 TYPE 1?1
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,               TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),  TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                   TYPE 3
  FOR TUTORIAL                                                 TYPE 4
  TO EXIT,                                                     TYPE 0
?2
```

ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE)

TO REMOVE ALL CONDITIONS AND MARGINALIZATIONS,	TYPE 1
TO ADD CONDITIONS AND/OR MARGINALIZATIONS,	TYPE 2
TO EXIT,	TYPE 0

?2

ASSIGN PARAMETER STATUS

YOU MAY NOW SAY HOW YOU WANT EACH PARAMETER TO BE TREATED IN THIS STAGE OF YOUR ANALYSIS. FOR EACH PARAMETER YOU MAY,

1. KEEP PARAMETER IN THE ANALYSIS -- LEARN SOMETHING ABOUT IT
2. CONDITIONALIZE THE PARAMETER -- SET IT TO A KNOWN VALUE.
3. MARGINALIZE THE PARAMETER -- IGNORE IT FOR THE MOMENT.

THE PATTERN OF CONDITIONING AND MARGINALIZING CANNOT BE TOTALLY ARBITRARY BUT MUST FOLLOW CERTAIN RULES -- BRIEFLY, YOU MUST MARGINALIZE OR CONDITIONALIZE ENTIRE ROWS AND OR COLUMNS OF THE 'PARAMETER TABLE'. FOR MORE DETAILS, EXIT AND SELECT THE TUTORIAL.

TO CONTINUE	TYPE 1
TO EXIT	TYPE 0?1

```
STATUS OF COLS OF PARAMETER TABLE FOR VARIABLE Y3 (META  )

---------------------------------------------
COL  7.  NAME: MU( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?1
COL  8.  NAME: C1( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
COL  9.  NAME: C2( Y3)   NEW STATUS (1=KEEP 2=COND 3=MARG):?3
```

```
                 CURRENT STATUS OF PARAMETERS

                     1  2  3  4  5  6  7  8  9
                     +  +  +  +  +  +  +  +  +
                 1+
                 2+  A        A        A
                 3+  A        A        A
                 4+  A        A        A

ROWS:   1.MU    2.A1    3.B1    4.A1B1

COLS:   1.MU( Y1)   2.C1( Y1)   3.C2( Y1)   4.MU( Y2)   5.C1( Y2)
        6.C2( Y2)   7.MU( Y3)   8.C1( Y3)   9.C2( Y3)

KEY:  ROWS=BETWEEN, COLS=WITHIN, A=ACTIVE, *=CONDITIONED, MU=MEAN

  IS THIS WHAT YOU WANTED? (1=YES.  2=NO, TRY AGAIN.)?1
```

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                 TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE), TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                      TYPE 3
  FOR TUTORIAL                                                   TYPE 4
  TO EXIT,                                                       TYPE 0
?1
```

```
MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
                A. S-STIM  B. A-STIM  C. ROUND

DEPENDENT VARIABLE, SUB

ID# EFFECT             STATUS    MEAN       STD. DEV.

 1. MEAN               MARG.
 2. A1                 ACTIVE +1.17833   +.507821
 3. B1                 ACTIVE +.355000   +.507821
 4. C1                 MARG.
 5. C2                 MARG.
 6. A1B1               ACTIVE -1.27000   +1.01564
 7. A1C1               MARG.
 8. B1C1               MARG.
 9. A1C2               MARG.
10. B1C2               MARG.
11. A1B1C1             MARG.
12. A1B1C2             MARG.

    TO CONTINUE                           TYPE 1?1
```

MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
A. S-STIM B. A-STIM C. ROUND

DEPENDENT VARIABLE, AFF

ID#	EFFECT	STATUS	MEAN	STD. DEV.
1.	MEAN	MARG.		
2.	A1	ACTIVE	-.150000	+.326095
3.	B1	ACTIVE	+1.41667	+.326095
4.	C1	MARG.		
5.	C2	MARG.		
6.	A1B1	ACTIVE	-1.45333	+.652191
7.	A1C1	MARG.		
8.	B1C1	MARG.		
9.	A1C2	MARG.		
10.	B1C2	MARG.		
11.	A1B1C1	MARG.		
12.	A1B1C2	MARG.		

TO CONTINUE TYPE 1?1

MEANS AND STANDARD DEVIATIONS OF THE EFFECTS OF FACTOR(S),
A. S-STIM B. A-STIM C. ROUND

DEPENDENT VARIABLE, META

ID#	EFFECT	STATUS	MEAN	STD. DEV.
1.	MEAN	MARG.		
2.	A1	ACTIVE	-.173334	+.335627
3.	B1	ACTIVE	+.773333	+.335627
4.	C1	MARG.		
5.	C2	MARG.		
6.	A1B1	ACTIVE	-.620001	+.671254
7.	A1C1	MARG.		
8.	B1C1	MARG.		
9.	A1C2	MARG.		
10.	B1C2	MARG.		
11.	A1B1C1	MARG.		
12.	A1B1C2	MARG.		

TO CONTINUE TYPE 1?1

```
THE POSTERIOR MATRIC T DISTRIBUTION OF THE MAIN EFFECTS AND INTERACTIONS
IS READY FOR EXAMINATION.

  TO LIST MEAN, STD. DEV., STATUS OF PARAMETERS,                   TYPE 1
  TO ALTER STATUS OF PARAMETERS (CONDITION OR MARGINALIZE),        TYPE 2
  TO COMPUTE PROBABILITY CONTENT OF AN HDR,                        TYPE 3
  FOR TUTORIAL                                                     TYPE 4
  TO EXIT,                                                         TYPE 0
?0
```

```
      MULTIVARIATE ANALYSIS OF VARIANCE

    1.  PUT DESCRIPTION OF LAYOUT OF EXPERIMENT ON FILE
    2.  PUT PRIOR INFORMATION ON FILE
    3.  PUT SUMMARY STATISTICS ON FILE
    4.  COMPUTE POSTERIOR DISTRIBUTION OF CELL MEANS
    5.  TRANSFORM CELL MEANS TO EFFECTS AND INTERACTIONS
    6.  EXAMINE MATRIC-T DISTRIBUTION OF PARAMETERS

    7.  TUTORIAL

    0.  EXIT

    TYPE IN YOUR CHOICE.?0
```

COMPONENT GROUP 6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS

61. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS OF VARIANCE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?0

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?0

Component Group 7

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?1

COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12. DATA MOVEMENT (INPUT/OUTPUT, EDITING)
13. DATA TRANSFORMATIONS
14. FILE MAINTENANCE (DATA GROUPING)

* NOT YET AVAILABLE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?12

COMPONENT 12. DATA MOVEMENT

1. DATA ENTRY AND TRANSFERS
2. DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0')?1

MODEL 1. DATA ENTRY AND TRANSFERS

1. DATA ENTRY FROM THE TERMINAL
2. DATA TRANSFER FROM DISK
3. DATA TRANSFER FROM THE CATALOG

4. DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0')?3

THE DATA FILE CATALOG

1. ITBS SCORES, SCHOOL #1
2. ITDS SCORES, SCHOOL #14
3. ESAA PILOT PROGRAM
4. IOWA COUNTY DATA
5. SAMPLE REGRESSION DATA
6. SAMPLE ANOVA DATA
7. SAMPLE MANOVA DATA
8. JUNIOR COLLEGE ACT SCORES

IF YOU WANT AN AVAILABLE DATA SET, TYPE ITS NUMBER (ELSE '0').?8

TO TRANSFER THESE DATA TO YOUR WORK FILE, TYPE '1'.
TO OBTAIN A DESCRIPTION OF THESE DATA, TYPE '2'.?1

HERE ARE THE SAMPLE SIZES BY COLLEGE AND YEAR.

	1968	1969
COLLEGE 6	175	179
COLLEGE 7	105	115
COLLEGE 8	118	112
COLLEGE 9	113	102
COLLEGE 10	128	118
COLLEGE 11	165	160
COLLEGE 12	132	108
COLLEGE 13	174	158
COLLEGE 15	167	167
COLLEGE 19	117	110

ENTER THE COLLEGE NUMBER AND YEAR YOU WANT.?7,1968

```
THE DATA SET IS NOW IN THE PERSONAL FILE.  IT WILL REMAIN THERE
UNTIL YOU SIGN OFF THE MONITOR OR REPLACE IT WITH ANOTHER DATA
SET.

IF YOU WISH TO PROCEED TO AN ANALYSIS,    TYPE '1'.
IF YOU WISH TO REMAIN IN DATA MANAGEMENT, TYPE '2'.?1
```

```
      COMPONENT GROUPS

1.    DATA MANAGEMENT FACILITY
2.    SIMPLE BAYESIAN PARAMETRIC MODELS
3.    DECISION THEORETIC MODELS
4.    BAYESIAN SIMULTANEOUS ESTIMATION
5.    BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.    BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.    ELEMENTARY CLASSICAL STATISTICS
8.    EXPLORATORY DATA ANALYSIS
9.    PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?7
```

COMPONENT GROUP 7. ELEMENTARY CLASSICAL STATISTICS

71. FREQUENCY DISTRIBUTIONS
72. SUMMARY STATISTICS
73. GRAPHIC DISPLAYS
74. REGRESSION

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?71

COMPONENT 71. FREQUENCY DISTRIBUTIONS

1. ABSOLUTE-FREQUENCY HISTOGRAMS
2. CONTINGENCY AND EXPECTANCY TABLES

ENTER THE NUMBER OF THE MODEL YOU WANT (ELSE '0').?1

HISTOGRAMS

```
THIS MODULE DRAWS ABSOLUTE-FREQUENCY HISTOGRAMS FOR THE
VARIABLE YOU SPECIFY.

DATA SET = C68-7

VARIABLES
1=ENGLSH   2= MATH    3=NATSCI   4=SOCSCI   5=  GPA

ENTER THE NUMBER OF THE VARIABLE FOR WHICH YOU WANT A
 HISTOGRAM ( NONE=0).?1
```

```
MINIMUM VALUE FOR ENGLSH  =        1.000
MAXIMUM VALUE FOR ENGLSH  =       30.000

ENTER THE NUMBER OF INTERVALS YOU WANT(MAX=15).?3

YOU CAN EITHER SPECIFY THE INTERVALS OR LET THE MODULE
DIVIDE THE RANGE INTO EQUAL LENGTH INTERVALS.  VALUES
EQUAL TO AN INTERVAL BOUNDARY ARE ASSIGNED TO THE INTERVAL
WITH THE LARGER VALUES.

IF YOU WANT THE MODULE TO SPECIFY THE INTERVALS, TYPE '1'.
IF YOU WANT TO SPECIFY THE INTERVALS,            TYPE '2'.?2
```

```
YOU ARE TO SPECIFY THE LOWER AND UPPER BOUNDARIES OF THE
INTERVALS.

INTERVAL 1    LOWER?1
              UPPER?10
INTERVAL 2           LOWER= 10        UPPER?20
INTERVAL 3           LOWER= 20        UPPER?30
```

```
      ABSOLUTE FREQUENCY HISTOGRAM OF      ENGLSH
----------------------------------------------------------
     INTERVAL      I     ABSOLUTE FREQUENCY
-----------------I---------1---------2---------3---------4
  1.000 I  10.000 I======7
 10.000 I  20.000 I======================================58
 20.000 I  30.000 I======================================40
-----------------I---------1---------2---------3---------4
WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1
```

HISTOGRAMS

DATA SET = C68-7

VARIABLES
1=ENGLSH   2= MATH   3=NATSCI   4=SOCSCI   5= GPA

ENTER THE NUMBER OF THE VARIABLE FOR WHICH YOU WANT A
HISTOGRAM (NONE=0).?5

MINIMUM VALUE FOR   GPA   =   0.000
MAXIMUM VALUE FOR   GPA   =   4.000

ENTER THE NUMBER OF INTERVALS YOU WANT(MAX=15).?4

MODULE SPECIFY INTERVALS=1   SPECIFY INTERVALS=2 ?1

```
      ABSOLUTE FREQUENCY HISTOGRAM OF         GPA
--------------------------------------------------------------
     INTERVAL      I      ABSOLUTE FREQUENCY
------------------I---------1---------2---------3---------4
 0.0000 I  1.0000 I=========9
 1.0000 I  2.0000 I===============================31
 2.0000 I  3.0000 I=============================================45
 3.0000 I  4.0000 I====================20
------------------I---------1---------2---------3---------4
WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1
```

```
                      HISTOGRAMS

DATA SET = C68-7

VARIABLES
1=ENGLSH   2= MATH    3=NATSCI   4=SOCSCI   5=  GPA

ENTER THE NUMBER OF THE VARIABLE FOR WHICH YOU WANT A
 HISTOGRAM ( NONE=0).?0
```

COMPONENT 71. FREQUENCY DISTRIBUTIONS

1. ABSOLUTE-FREQUENCY HISTOGRAMS
2. CONTINGENCY AND EXPECTANCY TABLES

ENTER THE NUMBER OF THE MODEL YOU WANT (ELSE '0').?2

TWO-WAY CONTINGENCY TABLES

EACH OF THE VARIABLES IN THE TWO-WAY CONTINGENCY TABLE
CAN BE DIVIDED INTO 2, 3 OR 4 CATEGORIES.

DATA SET = C68-7

VARIABLES:
1 = ENGLSH 2 = MATH 3 = NATSCI 4 = SOCSCI 5 = GPA

INPUT THE NUMBER OF THE VARIABLE YOU WANT ON THE HORIZONTAL
AXIS OF THE CONTINGENCY TABLE (EXIT=0).?1
INPUT THE NUMBER OF THE VARIABLE YOU WANT ON THE VERTICAL
AXIS OF THE CONTINGENCY TABLE (EXIT=0).?5

```
VARIABLE = ENGLSH    ( HORIZONTAL AXIS )

MINIMUM= 1
MAXIMUM= 30

INPUT THE NUMBER OF CATEGORIES(MAX 4) FOR ENGLSH?3

YOU CAN EITHER SPECIFY THE CATEGORY BOUNDARIES OR LET THE
MODULE SET UP EQUAL LENGTH CATEGORIES ACROSS THE FULL RANGE
OF THE VARIABLE.  ENTRIES EQUAL IN VALUE TO A COMMON BOUNDARY
WILL BE COUNTED AS A MEMBER OF THE CATEGORY WITH SMALLER
VALUES.  ENTRIES EQUAL IN VALUE TO THE LOWER BOUNDARY OF THE
CATEGORY WITH THE SMALLEST VALUES WILL BE COUNTED AS A
MEMBER OF THAT CATEGORY.

LET MODULE SET UP CATEGORIES=1    YOU SPECIFY CATEGORIES=2  ?2
CATEGORY 1       LOWER BOUNDARY ?1
                 UPPER BOUNDARY ?10

CATEGORY         2         LOWER= 10    UPPER=?20
CATEGORY         3         LOWER= 20    UPPER=?30




VARIABLE =    GPA    ( VERTICAL AXIS    )

MINIMUM= 0
MAXIMUM= 4

INPUT THE NUMBER OF CATEGORIES(MAX 4) FOR    GPA ?4


LET MODULE SET UP CATEGORIES=1    YOU SPECIFY CATEGORIES=2  ?1
```

```
OPTIONS  1.  OVERALL CONTINGENCY AND EXPECTANCY
         2.  ROW EXPECTANCY
         3.  COLUMN EXPECTANCY
         4.  EXPECTANCY ASSUMING INDEPENDENCE
         5.  REEXPRESS INTERVALS
         6.  SELECT DIFFERENT VARIABLES

   TYPE THE NUMBER OF THE OPTION OR '0' TO EXIT.?1
```

```
        OVERALL CONTINGENCY TABLE
----------------------ENGLSH----------------------
I FREQUENCYI     1.00I    10.00I    20.00II  ROW    I
I          I    10.00I    20.00I    30.00II  TOTALSI
I--  GPA - I---------I---------I---------II--------I
I    -0.00 I         I         I         II        I
I     1.00 I       2 I       7 I       0 II      9 I
I----------I---------I---------I---------II--------I
I     1.00 I         I         I         II        I
I     2.00 I       3 I      22 I       6 II     31 I
I----------I---------I---------I---------II--------I
I     2.00 I         I         I         II        I
I     3.00 I       1 I      23 I      21 II     45 I
I----------I---------I---------I---------II--------I
I     3.00 I         I         I         II        I
I     4.00 I       1 I       6 I      13 II     20 I
I==========I=========I=========I=========II========I
I   COLUMN I         I         I         II        I
I   TOTALS I       7 I      58 I      40 II    105 I
----------------------------------------------------
                 CHI SQUARE =    20.7    D.F. =    6

IF YOU WANT THE EXPECTANCY TABLE TYPE '1' ELSE '0'.?1
```

OVERALL EXPECTANCY TABLE

ENGLSH

PERCENT / GPA	1.00 10.00	10.00 20.00	20.00 30.00	ROW TOTALS
-0.00 1.00	2	7	0	9
1.00 2.00	3	21	6	30
2.00 3.00	1	22	20	43
3.00 4.00	1	6	12	19
COLUMN TOTALS	7	55	38	100

CHI SQUARE = 20.7 D.F. = 6

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1

OPTIONS 1. OVERALL CONTINGENCY AND EXPECTANCY
2. ROW EXPECTANCY
3. COLUMN EXPECTANCY
4. EXPECTANCY ASSUMING INDEPENDENCE
5. REEXPRESS INTERVALS
6. SELECT DIFFERENT VARIABLES

TYPE THE NUMBER OF THE OPTION OR '0' TO EXIT.?2

ROW EXPECTANCY

PERCENT / GPA	ENGLSH 1.00 – 10.00	ENGLSH 10.00 – 20.00	ENGLSH 20.00 – 30.00
-0.00 – 1.00	22	78	0
1.00 – 2.00	10	71	19
2.00 – 3.00	2	51	47
3.00 – 4.00	5	30	65

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1

OPTIONS
1. OVERALL CONTINGENCY AND EXPECTANCY
2. ROW EXPECTANCY
3. COLUMN EXPECTANCY
4. EXPECTANCY ASSUMING INDEPENDENCE
5. REEXPRESS INTERVALS
6. SELECT DIFFERENT VARIABLES

TYPE THE NUMBER OF THE OPTION OR '0' TO EXIT.?3

COLUMN EXPECTANCY

ENGLSH			
PERCENT	1.00 - 10.00	10.00 - 20.00	20.00 - 30.00
-- GPA -			
-0.00 - 1.00	29	12	0
1.00 - 2.00	43	38	15
2.00 - 3.00	14	40	52
3.00 - 4.00	14	10	32

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1

OPTIONS 1. OVERALL CONTINGENCY AND EXPECTANCY
2. ROW EXPECTANCY
3. COLUMN EXPECTANCY
4. EXPECTANCY ASSUMING INDEPENDENCE
5. REEXPRESS INTERVALS
6. SELECT DIFFERENT VARIABLES

TYPE THE NUMBER OF THE OPTION OR '0' TO EXIT.?4

```
     EXPECTANCY ASSUMING INDEPENDENCE
----------------------ENGLSH--------------
I PERCENT   I     1.00I    10.00I    20.00I
I           I    10.00I    20.00I    30.00I
I--   GPA - I---------I---------I---------I
I     -0.00 I         I         I         I
I      1.00 I     1   I     5   I     3   I
I-----------I---------I---------I---------I
I      1.00 I         I         I         I
I      2.00 I     2   I    16   I    11   I
I-----------I---------I---------I---------I
I      2.00 I         I         I         I
I      3.00 I     3   I    24   I    16   I
I-----------I---------I---------I---------I
I      3.00 I         I         I         I
I      4.00 I     1   I    11   I     7   I
I===========I=========I=========I=========I

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1
```

```
OPTIONS  1.  OVERALL CONTINGENCY AND EXPECTANCY
         2.  ROW EXPECTANCY
         3.  COLUMN EXPECTANCY
         4.  EXPECTANCY ASSUMING INDEPENDENCE
         5.  REEXPRESS INTERVALS
         6.  SELECT DIFFERENT VARIABLES

   TYPE THE NUMBER OF THE OPTION OR '0' TO EXIT.?5
```

```
VARIABLE = ENGLSH    ( HORIZONTAL AXIS )

MINIMUM= 1
MAXIMUM= 30

INPUT THE NUMBER OF CATEGORIES(MAX 4) FOR ENGLSH
( IF NO CHANGE, ENTER 0 )?0
```

```
VARIABLE =   GPA    ( VERTICAL AXIS   )

MINIMUM= 0
MAXIMUM= 4

INPUT THE NUMBER OF CATEGORIES(MAX 4) FOR   GPA
( IF NO CHANGE, ENTER 0 )?2

LET MODULE SET UP CATEGORIES=1    YOU SPECIFY CATEGORIES=2  ?2
CATEGORY 1      LOWER BOUNDARY ?0
                UPPER BOUNDARY ?2

CATEGORY        2         LOWER= 2     UPPER=?4
```

```
OPTIONS  1.  OVERALL CONTINGENCY AND EXPECTANCY
         2.  ROW EXPECTANCY
         3.  COLUMN EXPECTANCY
         4.  EXPECTANCY ASSUMING INDEPENDENCE
         5.  REEXPRESS INTERVALS
         6.  SELECT DIFFERENT VARIABLES

   TYPE THE NUMBER OF THE OPTION OR '0' TO EXIT.?1
```

OVERALL CONTINGENCY TABLE

FREQUENCY / GPA	ENGLSH 1.00 – 10.00	ENGLSH 10.00 – 20.00	ENGLSH 20.00 – 30.00	ROW TOTALS
-0.00 – 2.00	5	29	6	40
2.00 – 4.00	2	29	34	65
COLUMN TOTALS	7	58	40	105

```
                    CHI SQUARE =   15.8   D.F. =   2

IF YOU WANT THE EXPECTANCY TABLE TYPE '1' ELSE '0'.?0
```

```
OPTIONS  1.  OVERALL CONTINGENCY AND EXPECTANCY
         2.  ROW EXPECTANCY
         3.  COLUMN EXPECTANCY
         4.  EXPECTANCY ASSUMING INDEPENDENCE
         5.  REEXPRESS INTERVALS
         6.  SELECT DIFFERENT VARIABLES

   TYPE THE NUMBER OF THE OPTION OR '0' TO EXIT.?6
```

```
        TWO-WAY CONTINGENCY TABLES

EACH OF THE VARIABLES IN THE TWO-WAY CONTINGENCY TABLE
CAN BE DIVIDED INTO 2, 3 OR 4 CATEGORIES.

DATA SET = C68-7

VARIABLES:
 1 = ENGLSH 2 =  MATH  3 = NATSCI 4 = SOCSCI 5 =   GPA

INPUT THE NUMBER OF THE VARIABLE YOU WANT ON THE HORIZONTAL
AXIS OF THE CONTINGENCY TABLE (EXIT=0).?5
INPUT THE NUMBER OF THE VARIABLE YOU WANT ON THE VERTICAL
AXIS OF THE CONTINGENCY TABLE (EXIT=0).?2
```

```
VARIABLE =   GPA    ( HORIZONTAL AXIS )

MINIMUM= 0
MAXIMUM= 4

INPUT THE NUMBER OF CATEGORIES(MAX 4) FOR   GPA ?2

LET MODULE SET UP CATEGORIES=1    YOU SPECIFY CATEGORIES=2  ?1
```

```
VARIABLE =  MATH    ( VERTICAL AXIS   )

MINIMUM= 1
MAXIMUM= 32

INPUT THE NUMBER OF CATEGORIES(MAX 4) FOR  MATH ?2

LET MODULE SET UP CATEGORIES=1    YOU SPECIFY CATEGORIES=2  ?1
```

OPTIONS 1. OVERALL CONTINGENCY AND EXPECTANCY
2. ROW EXPECTANCY
3. COLUMN EXPECTANCY
4. EXPECTANCY ASSUMING INDEPENDENCE
5. REEXPRESS INTERVALS
6. SELECT DIFFERENT VARIABLES

TYPE THE NUMBER OF THE OPTION OR '0' TO EXIT.?1

OVERALL CONTINGENCY TABLE

FREQUENCY / MATH	GPA -0.00 – 2.00	GPA 2.00 – 4.00	ROW TOTALS
1.00 – 16.50	18	15	33
16.50 – 32.00	22	50	72
COLUMN TOTALS	40	65	105

CHI SQUARE = 5.5 D.F. = 1

IF YOU WANT THE EXPECTANCY TABLE TYPE '1' ELSE '0'.?0

```
OPTIONS  1.  OVERALL CONTINGENCY AND EXPECTANCY
         2.  ROW EXPECTANCY
         3.  COLUMN EXPECTANCY
         4.  EXPECTANCY ASSUMING INDEPENDENCE
         5.  REEXPRESS INTERVALS
         6.  SELECT DIFFERENT VARIABLES

   TYPE THE NUMBER OF THE OPTION OR '0' TO EXIT.?0
```

```
     COMPONENT 71.  FREQUENCY DISTRIBUTIONS

  1.  ABSOLUTE-FREQUENCY HISTOGRAMS
  2.  CONTINGENCY AND EXPECTANCY TABLES

ENTER THE NUMBER OF THE MODEL YOU WANT  ( ELSE '0' ).?0
```

COMPONENT GROUP 7. ELEMENTARY CLASSICAL STATISTICS

71. FREQUENCY DISTRIBUTIONS
72. SUMMARY STATISTICS
73. GRAPHIC DISPLAYS
74. REGRESSION

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?72

COMPONENT 72. SUMMARY STATISTICS

1. SUMMARY STATISTICS

ENTER THE NUMBER OF THE MODEL YOU WANT (ELSE '0').?1

SUMMARY STATISTICS

1. MEANS, ST.DEV.'S, PERCENTILES, ETC.
2. VARIANCE-COVARIANCE MATRIX
3. CORRELATION MATRIX

ENTER THE NUMBER OF THE OPTION YOU WANT (EXIT=0).?1

THE SUMMARY STATISTICS ARE NOW BEING COMPUTED.

HERE ARE THE DESCRIPTIVE/SUMMARY STATISTICS FOR YOUR DATA.

DATA SET = C68-7

VARIABLES

N= 105	ENGLSH	MATH	NATSCI	SOCSCI	GPA
MEAN	19.13	20.47	20.88	21.76	2.28
TRIMEAN**	19.00	21.50	21.00	22.00	2.35
MIDMEAN**	19.19	20.81	21.19	22.13	2.35
SMALLEST	1.00	1.00	7.00	10.00	0.00
LARGEST	30.00	32.00	32.00	33.00	4.00
10TH %ILE	13.00	12.00	14.00	14.00	1.10
25TH %ILE	16.00	16.00	17.00	18.00	1.70
50TH %ILE	19.00	22.00	21.00	22.00	2.40
75TH %ILE	22.00	26.00	25.00	26.00	2.90
90TH %ILE	26.00	29.00	27.00	28.00	3.40
ST.DEV.	5.13	6.79	5.24	5.30	0.90
VARIANCE	26.34	46.08	27.42	28.12	0.80
MIDSPREAD	29.00	31.00	25.00	23.00	4.00

** TRIMEAN, MIDMEAN DEFINED BY J.W.TUKEY E.D.A.,1977
WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

SUMMARY STATISTICS

1. MEANS, ST.DEV.'S, PERCENTILES, ETC.
2. VARIANCE-COVARIANCE MATRIX
3. CORRELATION MATRIX

ENTER THE NUMBER OF THE OPTION YOU WANT (EXIT=0).?2

THE STATISTICS ARE BEING CALCULATED...

VARIANCE-COVARIANCE MATRIX

DATA SET = C68-7

	ENGLSH	MATH	NATSCI	SOCSCI	GPA
ENGLSH	26.34	33.92	26.36	26.50	4.53
MATH		46.08	35.14	35.34	6.01
NATSCI			27.42	27.57	4.66
SOCSCI				28.12	4.70
GPA					0.80

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

SUMMARY STATISTICS

1. MEANS, ST.DEV.'S, PERCENTILES, ETC.
2. VARIANCE-COVARIANCE MATRIX
3. CORRELATION MATRIX

ENTER THE NUMBER OF THE OPTION YOU WANT (EXIT=0).?3

THE STATISTICS ARE BEING CALCULATED...

CORRELATION MATRIX

DATA SET = C68-7

	ENGLSH	MATH	NATSCI	SOCSCI	GPA
ENGLSH	1.00	0.98	0.98	0.97	0.98
MATH		1.00	0.99	0.98	0.99
NATSCI			1.00	0.99	0.99
SOCSCI				1.00	0.99
GPA					1.00

WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

SUMMARY STATISTICS

1. MEANS, ST.DEV.'S, PERCENTILES, ETC.
2. VARIANCE-COVARIANCE MATRIX
3. CORRELATION MATRIX

ENTER THE NUMBER OF THE OPTION YOU WANT (EXIT=0).?0

COMPONENT 72. SUMMARY STATISTICS

1. SUMMARY STATISTICS

ENTER THE NUMBER OF THE MODEL YOU WANT (ELSE '0').?0

COMPONENT GROUP 7. ELEMENTARY CLASSICAL STATISTICS

71. FREQUENCY DISTRIBUTIONS
72. SUMMARY STATISTICS
73. GRAPHIC DISPLAYS
74. REGRESSION

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?73

COMPONENT 73. GRAPHIC DISPLAYS

1. ABSOLUTE-FREQUENCY HISTOGRAMS
2. BIVARIATE PLOTS

ENTER THE NUMBER OF THE MODEL YOU WANT (ELSE '0').?1

HISTOGRAMS

THIS MODULE DRAWS ABSOLUTE-FREQUENCY HISTOGRAMS FOR THE VARIABLE YOU SPECIFY.

DATA SET = C68-7

VARIABLES
1=ENGLSH 2= MATH 3=NATSCI 4=SOCSCI 5= GPA

ENTER THE NUMBER OF THE VARIABLE FOR WHICH YOU WANT A HISTOGRAM (NONE=0).?3

MINIMUM VALUE FOR NATSCI = 7.000
MAXIMUM VALUE FOR NATSCI = 32.000

ENTER THE NUMBER OF INTERVALS YOU WANT(MAX=15).?5

YOU CAN EITHER SPECIFY THE INTERVALS OR LET THE MODULE DIVIDE THE RANGE INTO EQUAL LENGTH INTERVALS. VALUES EQUAL TO AN INTERVAL BOUNDARY ARE ASSIGNED TO THE INTERVAL WITH THE LARGER VALUES.

IF YOU WANT THE MODULE TO SPECIFY THE INTERVALS, TYPE '1'.
IF YOU WANT TO SPECIFY THE INTERVALS, TYPE '2'.?2

```
YOU ARE TO SPECIFY THE LOWER AND UPPER BOUNDARIES OF THE
INTERVALS.

INTERVAL 1    LOWER?5
              UPPER?10
INTERVAL 2           LOWER= 10        UPPER?15
INTERVAL 3           LOWER= 15        UPPER?20
INTERVAL 4           LOWER= 20        UPPER?25
INTERVAL 5           LOWER= 25        UPPER?30




      ABSOLUTE FREQUENCY HISTOGRAM OF       NATSCI
-------------------------------------------------------------
     INTERVAL      I     ABSOLUTE FREQUENCY
------------------I---------1---------2---------3---------4
  5.000 I  10.000 I===4
 10,000 I  15.000 I===========13
 15.000 I  20.000 I===============================32
 20.000 I  25.000 I==================================35
 25.000 I  30.000 I===================20
------------------I---------1---------2---------3---------4
WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1
```

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HISTOGRAMS

DATA SET = C68-7

VARIABLES
1=ENGLSH   2= MATH   3=NATSCI   4=SOCSCI   5= GPA

ENTER THE NUMBER OF THE VARIABLE FOR WHICH YOU WANT A
HISTOGRAM (NONE=0).?2

MINIMUM VALUE FOR MATH = 1.000
MAXIMUM VALUE FOR MATH = 32.000

ENTER THE NUMBER OF INTERVALS YOU WANT(MAX=15).?4

MODULE SPECIFY INTERVALS=1   SPECIFY INTERVALS=2 ?1

```
      ABSOLUTE FREQUENCY HISTOGRAM OF        MATH
------------------------------------------------------------
    INTERVAL      I      ABSOLUTE FREQUENCY
------------------I---------1---------2---------3---------4
  1.000 I    8.750 I==3
  8.750 I   16.500 I=============================30
 16.500 I   24.250 I======================================39
 24.250 I   32.000 I================================33
------------------I---------1---------2---------3---------4
WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1
```

```
                    HISTOGRAMS

DATA SET = C68-7

VARIABLES
1=ENGLSH   2= MATH    3=NATSCI   4=SOCSCI   5=  GPA

ENTER THE NUMBER OF THE VARIABLE FOR WHICH YOU WANT A
 HISTOGRAM ( NONE=0).?0
```

```
COMPONENT 73.  GRAPHIC DISPLAYS

 1.  ABSOLUTE-FREQUENCY HISTOGRAMS
 2.  BIVARIATE PLOTS

ENTER THE NUMBER OF THE MODEL YOU WANT  ( ELSE '0' ).?2
```

```
        BIVARIATE  PLOTS

THE VERTICAL AXIS IS DIVIDED INTO 15 EQUALLY SPACED INTERVALS
THE HORIZONTAL AXIS IS DIVIDED INTO 50.  THERE IS A TICK MARK
AT EVERY 5TH INTERVAL.

DATA SET = C68-7
VARIABLES:
 1      = ENGLSH
 2      =  MATH
 3      = NATSCI
 4      = SOCSCI
 5      =   GPA

INPUT THE NUMBER OF THE VARIABLE YOU WANT PLOTTED ON THE
HORIZONTAL AXIS (EXIT=0).?1

INPUT THE NUMBER OF THE VARIABLE YOU WANT PLOTTED ON THE
VERTICLE AXIS.?2
```

```
   MATH -+----------------------ENGLSH--------------------
  35.4 +
       I
       I                                1         1  1
       I            1                       13 223 21 11
       I                            1   13      1  1
  22.9 +        1  1 1      1  11   2 12 11  1  11  1
       I                       121  2 41        1
       I            1      11  12   4     2            1
       I                   12  11 11 1   1          1
       I            1    1 1  13  1  11 111  1
  10.4 +    1                 14     1
       I                            1 1
       I
       I
       I                 1         1   1
  -2.1 +
---------+---------+---------+---------+---------+---------+
      -1.90     5.12     12.14     19.15     26.17     33.19
*=10 TO 19      $=MORE THAN 19      CONTINUE=1  ?1
```

BIVARIATE PLOTS

THE VERTICAL AXIS IS DIVIDED INTO 15 EQUALLY SPACED INTERVALS
THE HORIZONTAL AXIS IS DIVIDED INTO 50. THERE IS A TICK MARK
AT EVERY 5TH INTERVAL.

DATA SET = C68-7
VARIABLES:
 1 = ENGLSH
 2 = MATH
 3 = NATSCI
 4 = SOCSCI
 5 = GPA

INPUT THE NUMBER OF THE VARIABLE YOU WANT PLOTTED ON THE
HORIZONTAL AXIS (EXIT=0).?5

INPUT THE NUMBER OF THE VARIABLE YOU WANT PLOTTED ON THE
VERTICLE AXIS.?1

```
  ENGLSH-+----------------------  GPA  --------------------
   33.2 +
         I
         I                      1                 1  1
         I                                 1 2   1
         I              1       1 1  1   3  1 1    12 1
   21.5 +                      2     11  3 11 2  1
         I              1 1      1112111 111  3 1 1
         I   2    1     1 111 11 311121  12211 1
         I   1 1       1  111 1  1   1 2 1        1
         I          1       12 1  11
    9.8 +               1      1 1
         I                1      1     1        1
         I             1
         I
         I            1
   -1.9 +
---------+---------+---------+---------+---------+---------+
     -0.40      0.57      1.54      2.50      3.47      4.44
*=10 TO 19      $=MORE THAN 19      CONTINUE=1  ?1
```

BIVARIATE PLOTS

THE VERTICAL AXIS IS DIVIDED INTO 15 EQUALLY SPACED INTERVALS
THE HORIZONTAL AXIS IS DIVIDED INTO 50. THERE IS A TICK MARK
AT EVERY 5TH INTERVAL.

```
DATA SET = C68-7
VARIABLES:
 1      = ENGLSH
 2      =  MATH
 3      = NATSCI
 4      = SOCSCI
 5      =   GPA
```

INPUT THE NUMBER OF THE VARIABLE YOU WANT PLOTTED ON THE
HORIZONTAL AXIS (EXIT=0).?0

COMPONENT 73. GRAPHIC DISPLAYS

1. ABSOLUTE-FREQUENCY HISTOGRAMS
2. BIVARIATE PLOTS

ENTER THE NUMBER OF THE MODEL YOU WANT (ELSE '0').?0

COMPONENT GROUP 7. ELEMENTARY CLASSICAL STATISTICS

71. FREQUENCY DISTRIBUTIONS
72. SUMMARY STATISTICS
73. GRAPHIC DISPLAYS
74. REGRESSION

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?74

COMPONENT 74. REGRESSION

1. SIMPLE OR MULTIPLE LINEAR REGRESSION

ENTER THE NUMBER OF THE MODEL YOU WANT (ELSE '0').?1

LINEAR REGRESSION

NUMBER OF OBSERVATIONS = 105

```
VARIABLES 1     ENGLSH
          2      MATH
          3     NATSCI
          4     SOCSCI
          5       GPA
```

TYPE THE NUMBER OF PREDICTOR VARIABLES YOU WILL USE (EXIT=0).?3

TYPE VARIABLE NUMBERS FOR 3   PREDICTOR VARIABLES
SEPARATE THE NUMBERS BY COMMAS
?1,2,3

TYPE THE VARIABLE NUMBER OF THE CRITERION VARIABLE.
?5

LINEAR REGRESSION ANALYSES

DATA SET NAME = C68-7

DEPENDENT VARIABLE: GPA

PARAMETER	ESTIMATE	STD ERROR EST.	T VALUE
INTERCEPT	0.289	0.348	
ENGLSH	0.069	0.020	3.499
MATH	0.025	0.012	2.041
NATSCI	0.008	0.020	0.392

THE F-STATISTICS FOR TESTING THE REGRESSION MODEL IS
12.7284 WITH 3 AND 101 DEGREES OF FREEDOM.

R-SQUARE 0.274

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1

SIMPLE OR MULTIPLE REGRESSION ANALYSIS

OPTIONS

1. REVIEW OF REGRESSION ANALYSES.
2. DISPLAY OF RESIDUALS AND PREDICTED VALUES(Y-HAT).
3. NORMAL PROBABILITY PLOT OF RESIDUALS.
4. BIVARIATE PLOTS.
5. TRANSFORMATION OF VARIABLES.

TYPE THE NUMBER OF OPTION YOU WANT (EXIT=0).?2

DATA SET NAME = C68-7

OBSERVATION	GPA	Y-HAT	RESIDUAL
1	2.30	2.349	-0.049
2	1.40	1.904	-0.504
3	3.50	2.417	1.083
4	3.60	2.664	0.936
5	1.10	2.784	-1.684
6	2.60	1.989	0.611
7	3.20	2.805	0.395
8	3.20	2.685	0.515
9	2.90	2.450	0.450
10	2.80	3.003	-0.203

IF YOU WANT TO CONTINUE DISPLAY TYPE '1', TO STOP TYPE '0'?1

DATA SET NAME = C68-7

OBSERVATION	GPA	Y-HAT	RESIDUAL
11	1.10	2.411	-1.311
12	2.70	2.187	0.513
13	1.80	2.498	-0.698
14	1.30	2.265	-0.965
15	2.00	2.174	-0.174
16	2.50	2.420	0.080
17	0.50	2.412	-1.912
18	2.00	2.129	-0.129
19	1.30	1.566	-0.266
20	1.80	2.886	-1.086

IF YOU WANT TO CONTINUE DISPLAY TYPE '1', TO STOP TYPE '0'?0

```
        SIMPLE OR MULTIPLE REGRESSION ANALYSIS

OPTIONS

 1. REVIEW OF REGRESSION ANALYSES.
 2. DISPLAY OF RESIDUALS AND PREDICTED VALUES(Y-HAT).
 3. NORMAL PROBABILITY PLOT OF RESIDUALS.
 4. BIVARIATE PLOTS.
 5. TRANSFORMATION OF VARIABLES.

TYPE THE NUMBER OF OPTION YOU WANT (EXIT=0).?4




              BIVARIATE  PLOTS

THE VERTICAL AXIS IS DIVIDED INTO 15 EQUALLY SPACED INTERVALS
THE HORIZONTAL AXIS IS DIVIDED INTO 50.  THERE IS A TICK MARK
AT EVERY 5TH INTERVAL.

DATA SET = C68-7
VARIABLES:
 1      = ENGLSH
 2      =  MATH
 3      = NATSCI
 4      =    GPA
 5      = RESIDL
 6      =  Y-HAT

INPUT THE NUMBER OF THE VARIABLE YOU WANT PLOTTED ON THE
HORIZONTAL AXIS (EXIT=0).?5

INPUT THE NUMBER OF THE VARIABLE YOU WANT PLOTTED ON THE
VERTICLE AXIS.?6
```

```
Y-HAT-+-----------------------RESIDL--------------------
  3.5 +
      I
      I                 1       1    1  1
      I                11   1    2 11    1  1  1
      I         1                111 1 112     1
  2.5 +                    11    1 1 12    1 11 1
      I    1      1    11 1    111111213 11   2
      I   1             2 1     22121 11 1    1    1
      I    11 1       1    11 111 1     11 1 1   1
      I             1    1 1  11       1 1   1
  1.5 +                       2 1       1
      I                    1             11             1
      I
      I
      I                           1
  0.4 +
---------+---------+---------+---------+---------+---------+
     -2.47     -1.50     -0.52      0.45      1.43      2.41
*=10 TO 19      $=MORE THAN 19      CONTINUE=1  ?1
```

BIVARIATE PLOTS

THE VERTICAL AXIS IS DIVIDED INTO 15 EQUALLY SPACED INTERVALS
THE HORIZONTAL AXIS IS DIVIDED INTO 50. THERE IS A TICK MARK
AT EVERY 5TH INTERVAL.

DATA SET = C68-7
VARIABLES:
1 = ENGLSH
2 = MATH
3 = NATSCI
4 = GPA
5 = RESIDL
6 = Y-HAT

INPUT THE NUMBER OF THE VARIABLE YOU WANT PLOTTED ON THE
HORIZONTAL AXIS (EXIT=0).?5

INPUT THE NUMBER OF THE VARIABLE YOU WANT PLOTTED ON THE
VERTICLE AXIS.?4

```
    GPA -+----------------------RESIDL--------------------
     4.4 +
         I
         I                               1 1 11
         I                              1   1 2   1
         I                            1121 1  2 1      1
     2.8 +                       1 11 111 21 1
         I                       31 232 31 11
         I                   1  212131 111
         I               2   1  12211  1111
         I              1   2   121
     1.2 +               112 21 3 1
         I        1  1   1 1 11      1
         I             1
         I     1
         I    111 1
    -0.4 +
---------+---------+---------+---------+---------+---------+
     -2.47     -1.50     -0.52      0.45      1.43      2.41
*=10 TO 19      &=MORE THAN 19      CONTINUE=1  ?1
```

BIVARIATE PLOTS

THE VERTICAL AXIS IS DIVIDED INTO 15 EQUALLY SPACED INTERVALS
THE HORIZONTAL AXIS IS DIVIDED INTO 50. THERE IS A TICK MARK
AT EVERY 5TH INTERVAL.

```
DATA SET = C68-7
VARIABLES:
 1      = ENGLSH
 2      =  MATH
 3      = NATSCI
 4      =   GPA
 5      = RESIDL
 6      =  Y-HAT
```

INPUT THE NUMBER OF THE VARIABLE YOU WANT PLOTTED ON THE
HORIZONTAL AXIS (EXIT=0).?0

SIMPLE OR MULTIPLE REGRESSION ANALYSIS

OPTIONS

1. REVIEW OF REGRESSION ANALYSES.
2. DISPLAY OF RESIDUALS AND PREDICTED VALUES(Y-HAT).
3. NORMAL PROBABILITY PLOT OF RESIDUALS.
4. BIVARIATE PLOTS.
5. TRANSFORMATION OF VARIABLES.

TYPE THE NUMBER OF OPTION YOU WANT (EXIT=0).?3

NORMAL PROBABILITY PLOT

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1' TO CONTINUE.?1

THERE WILL BE A PAUSE FOR CALCULATION.

```
DATA SET--C68-7     NORMAL PROBABILITY PLOT OF RESIDUALS
      1.96+                                                      1
          !
          !                                                  1
          !                                                 1
          !                                          12111
          +                                      1222
          !                                     332
          !                                 3433
          !                               441
          !                            254
     -0.06+                        24442
          !                      232
          !                    331
          !                  13
          !                221
          +              11
          !              1
          !             1
          !            1
     -2.07+    1   11 1
          /--------------+--------------+--------------+--------------+N= 105
        -3.0           -1.5            0.0            1.5            3.0
                                                TYPE '1' TO CONTINUE.?1




      SIMPLE OR MULTIPLE REGRESSION ANALYSIS

OPTIONS

 1. REVIEW OF REGRESSION ANALYSES.
 2. DISPLAY OF RESIDUALS AND PREDICTED VALUES(Y-HAT).
 3. NORMAL PROBABILITY PLOT OF RESIDUALS.
 4. BIVARIATE PLOTS.
 5. TRANSFORMATION OF VARIABLES.

TYPE THE NUMBER OF OPTION YOU WANT (EXIT=0).?1
```

LINEAR REGRESSION ANALYSES

DATA SET NAME = C68-7

DEPENDENT VARIABLE: GPA

PARAMETER	ESTIMATE	STD ERROR EST.	T VALUE
INTERCEPT	0.289	0.348	
ENGLSH	0.069	0.020	3.499
MATH	0.025	0.012	2.041
NATSCI	0.008	0.020	0.392

THE F-STATISTICS FOR TESTING THE REGRESSION MODEL IS
12.7284 WITH 3 AND 101 DEGREES OF FREEDOM.

R-SQUARE 0.274

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1

SIMPLE OR MULTIPLE REGRESSION ANALYSIS

OPTIONS

1. REVIEW OF REGRESSION ANALYSES.
2. DISPLAY OF RESIDUALS AND PREDICTED VALUES(Y-HAT).
3. NORMAL PROBABILITY PLOT OF RESIDUALS.
4. BIVARIATE PLOTS.
5. TRANSFORMATION OF VARIABLES.

TYPE THE NUMBER OF OPTION YOU WANT (EXIT=0).?2

DATA SET NAME = C68-7

OBSERVATION	GPA	Y-HAT	RESIDUAL
1	2.30	2.349	-0.049
2	1.40	1.904	-0.504
3	3.50	2.417	1.083
4	3.60	2.664	0.936
5	1.10	2.784	-1.684
6	2.60	1.989	0.611
7	3.20	2.805	0.395
8	3.20	2.685	0.515
9	2.90	2.450	0.450
10	2.80	3.003	-0.203

IF YOU WANT TO CONTINUE DISPLAY TYPE '1', TO STOP TYPE '0'?1

DATA SET NAME = C68-7

OBSERVATION	GPA	Y-HAT	RESIDUAL
11	1.10	2.411	-1.311
12	2.70	2.187	0.513
13	1.80	2.498	-0.698
14	1.30	2.265	-0.965
15	2.00	2.174	-0.174
16	2.50	2.420	0.080
17	0.50	2.412	-1.912
18	2.00	2.129	-0.129
19	1.30	1.566	-0.266
20	1.80	2.886	-1.086

IF YOU WANT TO CONTINUE DISPLAY TYPE '1', TO STOP TYPE '0'?1

DATA SET NAME = C68-7

OBSERVATION	GPA	Y-HAT	RESIDUAL
21	2.10	1.727	0.373
22	3.60	2.153	1.447
23	2.40	1.822	0.578
24	2.40	2.367	0.033
25	1.70	1.838	-0.138
26	4.00	2.888	1.112
27	2.70	2.854	-0.154
28	0.00	1.907	-1.907
29	2.00	2.093	-0.093
30	2.10	2.627	-0.527

IF YOU WANT TO CONTINUE DISPLAY TYPE '1', TO STOP TYPE '0'?1

DATA SET NAME = C68-7

OBSERVATION	GPA	Y-HAT	RESIDUAL
31	3.20	2.727	0.473
32	3.80	3.202	0.598
33	3.00	2.332	0.668
34	2.60	2.391	0.209
35	1.50	2.371	-0.871
36	3.40	3.074	0.326
37	2.70	2.364	0.336
38	2.40	2.657	-0.257
39	3.80	3.025	0.775
40	2.10	3.083	-0.983

IF YOU WANT TO CONTINUE DISPLAY TYPE '1', TO STOP TYPE '0'?1

DATA SET NAME = C68-7

OBSERVATION	GPA	Y-HAT	RESIDUAL
41	3.70	2.589	1.111
42	1.70	1.915	-0.215
43	1.20	1.746	-0.546
44	3.40	2.341	1.059
45	3.20	1.912	1.288
46	3.40	1.439	1.961
47	2.00	1.328	0.672
48	0.00	1.871	-1.871
49	1.00	1.771	-0.771
50	0.20	1.865	-1.665

IF YOU WANT TO CONTINUE DISPLAY TYPE '1', TO STOP TYPE '0'?1

DATA SET NAME = C68-7

OBSERVATION	GPA	Y-HAT	RESIDUAL
51	2.00	2.173	-0.173
52	2.80	2.304	0.496
53	2.20	2.114	0.086
54	1.40	1.644	-0.244
55	1.30	2.082	-0.782
56	2.70	2.521	0.179
57	3.10	2.327	0.773
58	1.50	1.618	-0.118
59	3.20	2.159	1.041
60	3.30	2.492	0.808

IF YOU WANT TO CONTINUE DISPLAY TYPE '1', TO STOP TYPE '0'?1

DATA SET NAME = C68-7

OBSERVATION	GPA	Y-HAT	RESIDUAL
61	3.00	2.937	0.063
62	1.40	2.003	-0.603
63	2.90	1.897	1.003
64	0.00	2.071	-2.071
65	3.20	2.611	0.589
66	2.70	2.500	0.200
67	1.10	2.017	-0.917
68	3.80	2.852	0.948
69	2.80	2.292	0.508
70	1.90	1.271	0.629

IF YOU WANT TO CONTINUE DISPLAY TYPE '1', TO STOP TYPE '0'?1

DATA SET NAME = C68-7

OBSERVATION	GPA	Y-HAT	RESIDUAL
71	2.70	2.929	-0.229
72	2.50	2.099	0.401
73	2.90	2.238	0.662
74	2.30	2.172	0.128
75	1.30	2.109	-0.809
76	1.00	1.446	-0.446
77	1.50	2.072	-0.572
78	2.40	1.874	0.526
79	2.60	2.301	0.299
80	3.00	2.692	0.308

IF YOU WANT TO CONTINUE DISPLAY TYPE '1', TO STOP TYPE '0'?1

DATA SET NAME = C68-7

OBSERVATION	GPA	Y-HAT	RESIDUAL
81	2.90	2.431	0.469
82	3.00	3.162	-0.162
83	2.70	2.614	0.086
84	3.50	3.038	0.462
85	1.90	2.878	-0.978
86	1.80	1.868	-0.068
87	0.90	0.690	0.210
88	2.80	2.674	0.126
89	2.40	2.482	-0.082
90	1.50	1.763	-0.263

IF YOU WANT TO CONTINUE DISPLAY TYPE '1', TO STOP TYPE '0'?1

DATA SET NAME = C68-7

OBSERVATION	GPA	Y-HAT	RESIDUAL
91	0.60	1.763	-1.163
92	3.00	2.967	0.033
93	2.00	2.315	-0.315
94	1.80	2.442	-0.642
95	2.60	1.737	0.863
96	2.00	1.894	0.106
97	1.70	1.988	-0.288
98	2.70	1.936	0.764
99	2.50	2.825	-0.325
100	2.10	1.612	0.488

IF YOU WANT TO CONTINUE DISPLAY TYPE '1', TO STOP TYPE '0'?1

DATA SET NAME = C68-7

OBSERVATION	GPA	Y-HAT	RESIDUAL
101	2.70	2.768	-0.068
102	2.30	2.086	0.214
103	2.10	2.098	0.002
104	2.40	2.951	-0.551
105	2.20	2.427	-0.227

WHEN YOU ARE READY TO CONTINUE TYPE '1'?1

SIMPLE OR MULTIPLE REGRESSION ANALYSIS

OPTIONS

1. REVIEW OF REGRESSION ANALYSES.
2. DISPLAY OF RESIDUALS AND PREDICTED VALUES(Y-HAT).
3. NORMAL PROBABILITY PLOT OF RESIDUALS.
4. BIVARIATE PLOTS.
5. TRANSFORMATION OF VARIABLES.

TYPE THE NUMBER OF OPTION YOU WANT (EXIT=0).?0

```
     COMPONENT 74.  REGRESSION

  1.  SIMPLE OR MULTIPLE LINEAR REGRESSION

ENTER THE NUMBER OF THE MODEL YOU WANT  ( ELSE '0' ).?0
```

```
COMPONENT GROUP 7.  ELEMENTARY CLASSICAL STATISTICS

71.  FREQUENCY DISTRIBUTIONS
72.  SUMMARY STATISTICS
73.  GRAPHIC DISPLAYS
74.  REGRESSION

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?0
```

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?

Component Group 8

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?1

COMPONENT GROUP 1. DATA MANAGEMENT FACILITY

11. *DATA STRUCTURES
12. DATA MOVEMENT (INPUT/OUTPUT, EDITING)
13. DATA TRANSFORMATIONS
14. FILE MAINTENANCE (DATA GROUPING)

* NOT YET AVAILABLE

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?12

COMPONENT 12. DATA MOVEMENT

1. DATA ENTRY AND TRANSFERS
2. DATA DISPLAY AND EDITING

IF YOU WANT AN AVAILABLE MODEL, TYPE ITS NUMBER (ELSE '0')?1

MODEL 1. DATA ENTRY AND TRANSFERS

1. DATA ENTRY FROM THE TERMINAL
2. DATA TRANSFER FROM DISK
3. DATA TRANSFER FROM THE CATALOG

4. DATA TRANSFER TO DISK

IF YOU WANT AN AVAILABLE MODULE, TYPE ITS NUMBER (ELSE '0')?3

THE DATA FILE CATALOG

1. ITBS SCORES, SCHOOL #1
2. ITBS SCORES, SCHOOL #14
3. ESAA PILOT PROGRAM
4. IOWA COUNTY DATA
5. SAMPLE REGRESSION DATA
6. SAMPLE ANOVA DATA
7. SAMPLE MANOVA DATA
8. JUNIOR COLLEGE ACT SCORES

IF YOU WANT AN AVAILABLE DATA SET, TYPE ITS NUMBER (ELSE '0').?8

TO TRANSFER THESE DATA TO YOUR WORK FILE, TYPE '1'.
TO OBTAIN A DESCRIPTION OF THESE DATA, TYPE '2'.?1

HERE ARE THE SAMPLE SIZES BY COLLEGE AND YEAR.

	1968	1969
COLLEGE 6	175	179
COLLEGE 7	105	115
COLLEGE 8	118	112
COLLEGE 9	113	102
COLLEGE 10	128	118
COLLEGE 11	165	160
COLLEGE 12	132	108
COLLEGE 13	174	158
COLLEGE 15	167	167
COLLEGE 19	117	110

ENTER THE COLLEGE NUMBER AND YEAR YOU WANT.?9,69

```
THE DATA SET IS NOW IN THE PERSONAL FILE.  IT WILL REMAIN THERE
UNTIL YOU SIGN OFF THE MONITOR OR REPLACE IT WITH ANOTHER DATA
SET.

IF YOU WISH TO PROCEED TO AN ANALYSIS,     TYPE '1'.
IF YOU WISH TO REMAIN IN DATA MANAGEMENT, TYPE '2'.?1
```

```
     COMPONENT GROUPS

1.   DATA MANAGEMENT FACILITY
2.   SIMPLE BAYESIAN PARAMETRIC MODELS
3.   DECISION THEORETIC MODELS
4.   BAYESIAN SIMULTANEOUS ESTIMATION
5.   BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6.   BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7.   ELEMENTARY CLASSICAL STATISTICS
8.   EXPLORATORY DATA ANALYSIS
9.   PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?8
```

COMPONENT GROUP 8. EXPLORATORY DATA ANALYSIS

81. UNIVARIATE EXPLORATORY DATA ANALYSIS
82. BIVARIATE EXPLORATORY DATA ANALYSIS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?81

COMPONENT 81. UNIVARIATE EXPLORATORY DATA ANALYSIS

MODEL 1. REGULAR CRT APPLICATIONS

TYPE THE NUMBER OF A MODEL OR '0'.?1

```
MODEL 1. REGULAR CRT APPLICATIONS OF UNIVARIATE EDA

OVERVIEW MODULES
  1. DESCRIPTION OF EXPLORATORY DATA ANALYSIS(EDA)
  2. QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

TECHNIQUE MODULES
  3. BOX-PLOTS
  4. STEM AND LEAF
  5. EMPIRICAL PROBABILITY DENSITY FUNCTION(EPDF)
  6. SMOOTHED EMPIRICAL PROBABILITY DENSITY FUNCTION
  7. EMPIRICAL CUMULATIVE DISTRIBUTION FUNCTION(ECDF)
  8. NORMAL PROBABILITY PLOT

ALTERATION MODULES
  9. STANDARDIZATION
 10. TRANSFORMATION(REEXPRESSION)
 11. TRIMMING OF EXTREMES
 12. SELECTION OF A VARIABLE #(SUMMARY STATISTICS)
 13. RETRIEVAL OF ORIGINAL VARIABLE(AFTER ALTERATION)

              TYPE THE NUMBER OF A MODULE OR '0'.?12
```

```
             UNIVARIATE EXPLORATORY DATA ANALYSIS

YOU NOW ARE ASKED TO CHOOSE THE VARIABLE YOU WANT TO EXAMINE
WITH EXPLORATORY DATA ANALYSIS TECHNIQUES.

YOU CAN SEE THE SUMMARY STATISTICS OF ALL THE VARIABLES
IN YOUR PERSONAL FILE  BEFORE THE SELECTION, IF NECESSARY.


THE DATA SET IN YOUR PERSONAL FILE IS NAMED C69-9   .

TO SEE SUMMARY STATISTICS,      TYPE '2'.
TO CONTINUE,                    TYPE '1'.?2
```

SUMMARY STATISTICS

1. MEANS, ST.DEV.'S, PERCENTILES, ETC.
2. VARIANCE-COVARIANCE MATRIX
3. CORRELATION MATRIX

ENTER THE NUMBER OF THE OPTION YOU WANT (EXIT=0).?1

THE SUMMARY STATISTICS ARE NOW BEING COMPUTED.

HERE ARE THE DESCRIPTIVE/SUMMARY STATISTICS FOR YOUR DATA.

DATA SET = C69-9

VARIABLES					
N= 102	ENGLSH	MATH	NATSCI	SOCSCI	GPA
MEAN	18.05	18.11	18.65	18.91	2.27
TRIMEAN**	18.75	17.50	18.75	18.50	2.35
MIDMEAN**	18.57	17.65	19.04	18.39	2.34
SMALLEST	5.00	1.00	3.00	1.00	0.00
LARGEST	26.00	31.00	30.00	33.00	3.80
10TH %ILE	12.00	11.00	11.00	12.00	1.10
25TH %ILE	16.00	14.00	14.00	14.00	1.80
50TH %ILE	19.00	17.00	19.00	18.00	2.40
75TH %ILE	21.00	22.00	23.00	24.00	2.80
90TH %ILE	23.00	26.00	26.00	28.00	3.40
ST.DEV.	4.32	6.08	5.92	6.23	0.82
VARIANCE	18.65	36.96	35.07	38.85	0.68
MIDSPREAD	21.00	30.00	27.00	32.00	3.80

** TRIMEAN, MIDMEAN DEFINED BY J.W.TUKEY E.D.A.,1977
WHEN YOU ARE READY TO CONTINUE, TYPE '1'.?1

SUMMARY STATISTICS

1. MEANS, ST.DEV.'S, PERCENTILES, ETC.
2. VARIANCE-COVARIANCE MATRIX
3. CORRELATION MATRIX

ENTER THE NUMBER OF THE OPTION YOU WANT (EXIT=0).?0

UNIVARIATE EXPLORATORY DATA ANALYSIS

YOU NOW ARE ASKED TO CHOOSE THE VARIABLE YOU WANT TO EXAMINE WITH EXPLORATORY DATA ANALYSIS TECHNIQUES.

YOU CAN SEE THE SUMMARY STATISTICS OF ALL THE VARIABLES IN YOUR PERSONAL FILE BEFORE THE SELECTION, IF NECESSARY.

THE DATA SET IN YOUR PERSONAL FILE IS NAMED C69-9 .

TO SEE SUMMARY STATISTICS, TYPE '2'.
TO CONTINUE, TYPE '1'.?1

```
YOU HAVE THE FOLLOWING VARIABLES IN YOUR PERSONAL FILE:

VARIABLE  1     IS ENGLSH
VARIABLE  2     IS  MATH
VARIABLE  3     IS NATSCI
VARIABLE  4     IS SOCSCI
VARIABLE  5     IS   GPA

TO SELECT A VARIABLE TYPE ITS NUMBER.?3
```

```
               UNIVARIATE EXPLORATORY DATA ANALYSIS

     OPTIONS:

   OVERVIEW
        1.   DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
        2.   QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

   TECHNIQUES
        3.   BOX PLOT
        4.   STEM AND LEAF
        5.   EMPIRICAL PDF
        6.   SMOOTHED EMPIRICAL PDF
        7.   EMPIRICAL CDF
        8.   NORMAL PROBABILITY PLOT

   ALTERATION
        9.   STANDARDIZATION
       10.   TRANSFORMATION(REEXPRESSION)
       11.   TRIMMING OF EXTREMES
       12.   SELECTION OF A NEW VARIABLE # (SUMMARY STATISTICS)
       13.   RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

                 TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?3
```

BOX PLOT

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1'.?1

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

```
                         B O X   P L O T
DATA SET--C69-9              VARIABLE--NATSCI            NCOUNT-- 102
     MAX         30
      !
      !
      !
      !
      !
  !--Q3---!      23
  !       !
  !       !
  !--MED--!      19   MEAN =        18.647    SD =        5.9221
  !       !
  !       !
  !--Q1---!      14
      !
      !
      !
      !
      !
      !
      !
     MIN         3             TO CONTINUE, TYPE '1'.?1
```

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UNIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
2. QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

TECHNIQUES
3. BOX PLOT
4. STEM AND LEAF
5. EMPIRICAL PDF
6. SMOOTHED EMPIRICAL PDF
7. EMPIRICAL CDF
8. NORMAL PROBABILITY PLOT

ALTERATION
9. STANDARDIZATION
10. TRANSFORMATION(REEXPRESSION)
11. TRIMMING OF EXTREMES
12. SELECTION OF A NEW VARIABLE ; (SUMMARY STATISTICS)
13. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?4

STEM--AND--LEAF

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1' TO CONTINUE.?1

THERE WILL BE A SLIGHT PAUSE FOR CALCULATION.

```
STEM AND LEAF      DATA SET--C69-9     VARIABLE--NATSCI    NCOUNT--102
   STEM & LEAF NEEDS TO BE MULTIPLIED BY 10 TO THE  1 POWER.
         3
         3  0
         2  899
         2  66666667777
         2  444555
         2  2222222233333333
         2  000000011111
         1  88888999999999
         1  67777
         1  44444455555
         1  222222333
         1  00111
         0  88999
         0  6
         0  5
         0  3                    TO CONTINUE TYPE '1'?1
```

```
              UNIVARIATE EXPLORATORY DATA ANALYSIS

   OPTIONS:

 OVERVIEW
      1.  DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
      2.  QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

 TECHNIQUES
      3.  BOX PLOT
      4.  STEM AND LEAF
      5.  EMPIRICAL PDF
      6.  SMOOTHED EMPIRICAL PDF
      7.  EMPIRICAL CDF
      8.  NORMAL PROBABILITY PLOT

 ALTERATION
      9.  STANDARDIZATION
     10.  TRANSFORMATION(REEXPRESSION)
     11.  TRIMMING OF EXTREMES
     12.  SELECTION OF A NEW VARIABLE & (SUMMARY STATISTICS)
     13.  RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

            TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?5
```

EMPIRICAL PROBABILITY DENSITY FUNCTION

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1'.?1

THERE WILL BE A PAUSE FOR CALCULATION.

```
DATA SET--C69-9    E M P I R I C A L   P D F          VARIABLE--NATSCI
      30.00!***
           !*
           !***********
           !***
           !***
           !****************
           !*****
           !*******
           !****************
           !****
      16.50!*
           !***********
           !***
           !******
           !*****
           !***
           !**
           !*         NCOUNT = 102
           !*
       3.00!*
           !----0----1----1----2----2----3----3----4----4----5----5----6
                5    0    5    0    5    0    5    0    5    0    5    0
```

TYPE '2' FOR SMOOTHED EPDF ELSE '1' TO CONTINUE.?2

```
      SMOOTHED EMPIRICAL PROBABILITY DENSITY FUNCTION

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1'.?1

      THERE WILL BE A PAUSE FOR CALCULATION.
```

```
DATA SET--C69-9            SMOOTH  EMPIRICAL  PDF          VARIABLE--NATSCI
      30.00!***
           !*****
           !*****
           !******
           !*******
           !********
           !*********
           !*********
           !*********
           !*******
      16.50!*****
           !*****
           !*******
           !*****
           !*****
           !***
           !**
           !*      NUMBER OF SMOOTHS = 1
           !*
       3.00!*
           !----0----1----1----2----2----3----3----4----4----5----5----6
                5    0    5    0    5    0    5    0    5    0    5    0
              TYPE '2' TO SMOOTH AGAIN OR TYPE '1' TO CONTINUE.?2
```

```
DATA SET--C69-9          SMOOTH  EMPIRICAL  PDF         VARIABLE--NATSCI
      30.00!***
           !****
           !*****
           !******
           !*******
           !********
           !*********
           !*********
           !********
           !*******
      16.50!******
           !******
           !******
           !******
           !****
           !***
           !**
           !*      NUMBER OF SMOOTHS = 2
           !*
       3.00!*
           !----0----1----1----2----2----3----3----4----4----5----5----6
                5    0    5    0    5    0    5    0    5    0    5    0
              TYPE '2' TO SMOOTH AGAIN OR TYPE '1' TO CONTINUE.?2
```

```
DATA SET--C69-9          SMOOTH  EMPIRICAL  PDF         VARIABLE--NATSCI
      30.00!***
           !****
           !*****
           !******
           !*******
           !********
           !*********
           !*********
           !********
           !*******
      16.50!******
           !******
           !******
           !*****
           !****
           !***
           !**
           !*      NUMBER OF SMOOTHS = 3
           !*
       3.00!*
           !----0----1----1----2----2----3----3----4----4----5----5----6
                5    0    5    0    5    0    5    0    5    0    5    0
              TYPE '2' TO SMOOTH AGAIN OR TYPE '1' TO CONTINUE.?2
```

```
DATA SET--C69-9            SMOOTH  EMPIRICAL  PDF          VARIABLE--NATSCI
      30.00!***
           !****
           !*****
           !******
           !*******
           !********
           !*********
           !*********
           !********
           !*******
      16.50!******
           !******
           !******
           !*****
           !****
           !***     PLOT DID NOT CHANGE WITH THAT SMOOTH.
           !**
           !*     NUMBER OF SMOOTHS = 4
           !*
       3.00!*
           !----0----1----1----2----2----3----3----4----4----5----5----6
                5    0    5    0    5    0    5    0    5    0    5    0
              TYPE '2' TO SMOOTH AGAIN OR TYPE '1' TO CONTINUE.?1
```

```
              UNIVARIATE EXPLORATORY DATA ANALYSIS

    OPTIONS:

  OVERVIEW
        1.  DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
        2.  QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

  TECHNIQUES
        3.  BOX PLOT
        4.  STEM AND LEAF
        5.  EMPIRICAL PDF
        6.  SMOOTHED EMPIRICAL PDF
        7.  EMPIRICAL CDF
        8.  NORMAL PROBABILITY PLOT

  ALTERATION
        9.  STANDARDIZATION
       10.  TRANSFORMATION(REEXPRESSION)
       11.  TRIMMING OF EXTREMES
       12.  SELECTION OF A NEW VARIABLE ; (SUMMARY STATISTICS)
       13.  RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

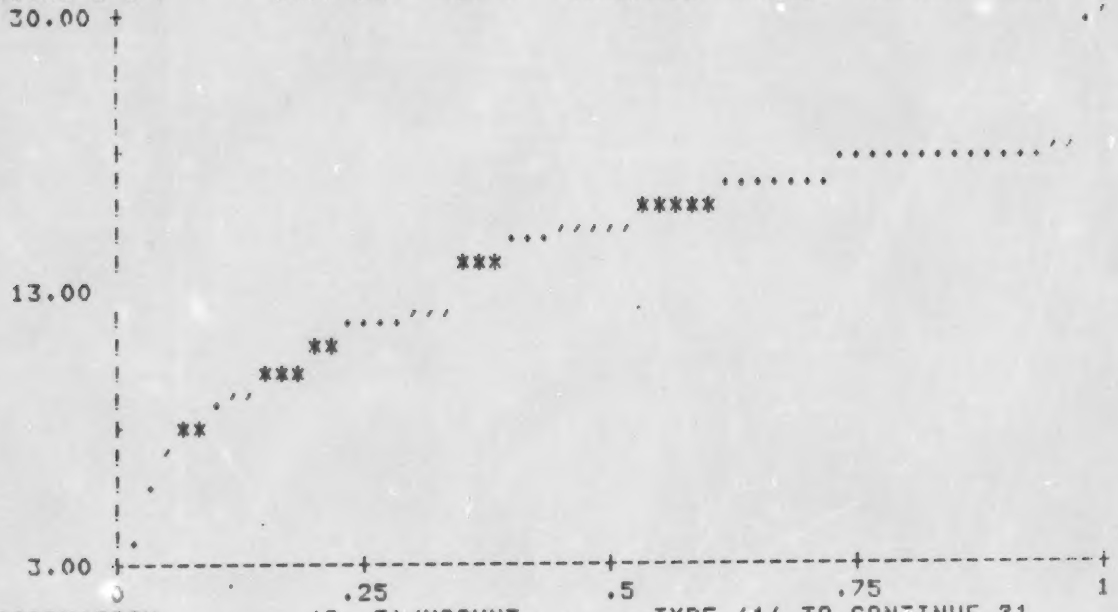
               TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?7
```

EMPIRICAL CUMULATIVE DISTRIBUTION FUNCTION

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1'.?1

THERE WILL BE A PAUSE FOR CALCULATION.

EMPIRICAL C D F   DATA SET--C69-9   VARIABLE--NATSCI   NCOUNT--102



I=OBSERVATION   (I-.5)/NCOUNT   TYPE '1' TO CONTINUE.?1

UNIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
2. QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

TECHNIQUES
3. BOX PLOT
4. STEM AND LEAF
5. EMPIRICAL PDF
6. SMOOTHED EMPIRICAL PDF
7. EMPIRICAL CDF
8. NORMAL PROBABILITY PLOT

ALTERATION
9. STANDARDIZATION
10. TRANSFORMATION(REEXPRESSION)
11. TRIMMING OF EXTREMFS
12. SELECTION OF A NEW VARIABLE ; (SUMMARY STATISTICS)
13. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?8

NORMAL PROBABILITY PLOT

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1' TO CONTINUE.?1

THERE WILL BE A PAUSE FOR CALCULATION.

```
DATA SET--C69-9    NORMAL  PROBABILITY   PLOT         VARIABLE--NATSCI
     30.00+                                                1 1    1
          !                                               1
          !                                        2222111
          !                                      12
          !                                     12
          +                                 43432
          !                               14
          !                              43
          !                          3444
          !                         31
     16.50+                         1
          !                     1343
          !                    12
          !                  222
          !               122
          +             111
          !           11
          !          1
          !        1
      3.00+    1
          /--------------+--------------+--------------+--------------+N= 102
        -3.0           -1.5            0.0            1.5            3.0
                                           TYPE '1' TO CONTINUE.?1
```

UNIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
2. QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

TECHNIQUES
3. BOX PLOT
4. STEM AND LEAF
5. EMPIRICAL PDF
6. SMOOTHED EMPIRICAL PDF
7. EMPIRICAL CDF
8. NORMAL PROBABILITY PLOT

ALTERATION
9. STANDARDIZATION
10. TRANSFORMATION(REEXPRESSION)
11. TRIMMING OF EXTREMES
12. SELECTION OF A NEW VARIABLE ; (SUMMARY STATISTICS)
13. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.??

UNIVARIATE STANDARDIZATION

TYPE '2' FOR AN EXPLANATION OR '1' TO CONTINUE.?1

	MEAN	STANDARD DEVIATION
NATSCI	18.647	5.92

THE STANDARDIZATION HAS NOW BEEN COMPLETED. TO RETRIEVE YOUR ORIGINAL DATA YOU MUST CHOOSE THE APPROPRIATE MODULE IN THE MODULE LIST (12 OR 13) .

TO ANALYZE STANDARDIZED DATA, TYPE '1'.
TO CANCEL THE STANDARDIZATION, TYPE '0'.?1

UNIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
2. QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

TECHNIQUES
3. BOX PLOT
4. STEM AND LEAF
5. EMPIRICAL PDF
6. SMOOTHED EMPIRICAL PDF
7. EMPIRICAL CDF
8. NORMAL PROBABILITY PLOT

ALTERATION
9. STANDARDIZATION
10. TRANSFORMATION(REEXPRESSION)
11. TRIMMING OF EXTREMES
12. SELECTION OF A NEW VARIABLE ; (SUMMARY STATISTICS)
13. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?3

BOX PLOT

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1'.?1

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

```
                        B O X   P L O T
DATA SET--C69-9               VARIABLE--NATSCI             NCOUNT-- 102
     MAX        1.91704
      !
      !
      !
      !
      !
      !
   !--Q3---!    .73503
   !       !
   !       !
   !--MED--!    5.95968E-02   MEAN =          -0.000    SD =        1.0000
   !       !
   !       !
   !--Q1---!   -.784695
      !
      !
      !
      !
      !
      !

     MIN       -2.64214               TO CONTINUE, TYPE '1'.?1
```

UNIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
2. QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

TECHNIQUES
3. BOX PLOT
4. STEM AND LEAF
5. EMPIRICAL PDF
6. SMOOTHED EMPIRICAL PDF
7. EMPIRICAL CDF
8. NORMAL PROBABILITY PLOT

ALTERATION
9. STANDARDIZATION
10. TRANSFORMATION(REEXPRESSION)
11. TRIMMING OF EXTREMES
12. SELECTION OF A NEW VARIABLE ; (SUMMARY STATISTICS)
13. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?13

ORIGINAL DATA HAS BEEN RETRIEVED.

THE DATA SET IS NAMED C69-9

VARIABLE IS NATSCI

NCOUNT IS 102

TYPE '1' TO CONTINUE.?1

UNIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
2. QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

TECHNIQUES
3. BOX PLOT
4. STEM AND LEAF
5. EMPIRICAL PDF
6. SMOOTHED EMPIRICAL PDF
7. EMPIRICAL CDF
8. NORMAL PROBABILITY PLOT

ALTERATION
9. STANDARDIZATION
10. TRANSFORMATION(REEXPRESSION)
11. TRIMMING OF EXTREMES
12. SELECTION OF A NEW VARIABLE # (SUMMARY STATISTICS)
13. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?10

TRANSFORMATION(REEXPRESSION)

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1'.?1

```
THIS MODULE ALLOWS THE FOLLOWING TRANSFORMATIONS:

   1.  POWER    -- Y=A*( (X+C)**Z )              Z IS THE POWER.
   2.   LOG     -- Y=A*( LOG(X+C)/LOG(B) )       B IS THE BASE OF LOG.
   3.  LOG-ODDS-- Y=LOG((X-A)/(B-X))/LOG(C)      C IS THE BASE OF LOG.
   4.  ARCSIN   -- Y=ASIN(SQRT(X/N))             ARCSIN OF ROOT X/N
   5.   RANK    -- Y=LOG((I-1/3)/(N-I+2/3))      I IS RANK(BASE = 10).

NOTATION:    X IS OBSERVATION.
             Y IS NEW VALUE.
             A,B,C ARE USER SPECIFIED CONSTANTS.
             I IS A RANK.
             N IS THE NUMBER OF BSERVATIONS.
             LOG IN THE RANK TRANSFORMATION IS THE COMMON LOGARITHM.


 TO GET THE GRAPHICAL REPRESENTATION OF THE TRANSFORMATION,
USE COMPONENT 82, SELECT THE SAME VARIABLE FOR BOTH AXES,
AND USE SCATTER PLOT MODULE (4) AFTER TRANSFORMING Y-AXIS.

 THE TRANSFORMED DATA WILL REMAIN UNTIL YOU RETRIEVE THE ORIGINAL
DATA OR YOU SELECT ANOTHER VARIABLE.

   TYPE THE NUMBER OF THE TRANSFORMATION YOU WANT OR '0' TO EXIT.?2









DATA SET NAME = C69-9   VARIABLE NAME = NATSCI

LOG TRANSFORMATION   Y=A*( LOG(X+C)/LOG(B) )


ENTER THE BASE OF LOG.?10

ENTER THE CONSTANT C FOR THE LOG TRANSFORMATION.
 C  SHOULD BE GREATER THAN -3    .?0

ENTER THE CONSTANT A .
 THE ABSOLUTE VALUE OF  A  SHOULD BE LESS THAN  6.70322E+17   .?10

THE TRANSFORMATION HAS NOW BEEN COMPLETED.  THE TRANSFORMED DATA
WILL NOW REPLACE THE ORIGINAL DATA YOU HAVE CHOSEN TO EXAMINE. YOU
CAN RETRIEVE YOUR ORIGINAL DATA BY CHOOSING THE APPROPRIATE
MODULE IN THE OPTION LIST.
                TO ANALYZE TRANSFORMED DATA,    TYPE '1'.
                TO CANCEL THE TRANSFORMATION,   TYPE '0'.?1
```

UNIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
2. QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

TECHNIQUES
3. BOX PLOT
4. STEM AND LEAF
5. EMPIRICAL PDF
6. SMOOTHED EMPIRICAL PDF
7. EMPIRICAL CDF
8. NORMAL PROBABILITY PLOT

ALTERATION
9. STANDARDIZATION
10. TRANSFORMATION(REEXPRESSION)
11. TRIMMING OF EXTREMES
12. SELECTION OF A NEW VARIABLE ; (SUMMARY STATISTICS)
13. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?3

BOX PLOT

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1'.?1

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

```
                  B O X   P L O T
DATA SET--C69-9            VARIABLE--NATSCI          NCOUNT-- 102
    MAX          14.7712
     !
     !
  !--Q3---!      13.6173
  !--MED--!      12.7875    MEAN =         12.419    SD =          1.7269
  !       !
  !       !
  !--Q1---!      11.4613
     !
     !
     !
     !
     !
     !
     !
     !
     !
     !
     !
     !
    MIN          4.77121             TO CONTINUE, TYPE '1'.?1
```

```
               UNIVARIATE EXPLORATORY DATA ANALYSIS

    OPTIONS:

  OVERVIEW
       1.  DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
       2.  QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

  TECHNIQUES
       3.  BOX PLOT
       4.  STEM AND LEAF
       5.  EMPIRICAL PDF
       6.  SMOOTHED EMPIRICAL PDF
       7.  EMPIRICAL CDF
       8.  NORMAL PROBABILITY PLOT

  ALTERATION
       9.  STANDARDIZATION
      10.  TRANSFORMATION(REEXPRESSION)
      11.  TRIMMING OF EXTREMES
      12.  SELECTION OF A NEW VARIABLE ; (SUMMARY STATISTICS)
      13.  RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

                TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?13
```

ORIGINAL DATA HAS BEEN RETRIEVED.

THE DATA SET IS NAMED C69-9

VARIABLE IS NATSCI

NCOUNT IS 102

TYPE '1' TO CONTINUE.?1

UNIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW

1. DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
2. QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

TECHNIQUES

3. BOX PLOT
4. STEM AND LEAF
5. EMPIRICAL PDF
6. SMOOTHED EMPIRICAL PDF
7. EMPIRICAL CDF
8. NORMAL PROBABILITY PLOT

ALTERATION

9. STANDARDIZATION
10. TRANSFORMATION(REEXPRESSION)
11. TRIMMING OF EXTREMES
12. SELECTION OF A NEW VARIABLE # (SUMMARY STATISTICS)
13. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?11

```
     TRIMMING OF OUTLIERS

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1'.?1



INPUT THE PERCENT TRIMMING OFF EACH END YOU WISH.
     MAXIMUM TRIMMING ALLOWED IS 15 PERCENT.
INPUT PERCENT FOR LOWER TAIL(0 THROUGH 15).?10

NEXT INPUT PERCENT FOR UPPER TAIL(0 THROUGH 15).?10
```

```
THE TRIMMING HAS NOW BEEN COMPLETED.  THE TRIMMED DATA WILL
NOW REPLACE THE ORIGINAL DATA YOU HAVE CHOSEN TO EXAMINE.  YOU
CAN RETRIEVE YOUR ORIGINAL DATA BY CHOOSING THE APPROPRIATE
MODULE IN THE OPTION LIST (12 OR 13).

DATA SET -- C69-9
VARIABLE -- NATSCI

    NEW NCOUNT = 82

                    TO ANALYZE TRIMMED DATA, TYPE '1'.
                    TO CANCEL THE TRIMMING,  TYPE '0'.?1
```

UNIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
2. QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

TECHNIQUES
3. BOX PLOT
4. STEM AND LEAF
5. EMPIRICAL PDF
6. SMOOTHED EMPIRICAL PDF
7. EMPIRICAL CDF
8. NORMAL PROBABILITY PLOT

ALTERATION
9. STANDARDIZATION
10. TRANSFORMATION(REEXPRESSION)
11. TRIMMING OF EXTREMES
12. SELECTION OF A NEW VARIABLE ; (SUMMARY STATISTICS)
13. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?4

STEM--AND--LEAF

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1' TO CONTINUE.?1

THERE WILL BE A SLIGHT PAUSE FOR CALCULATION.

```
STEM AND LEAF      DATA SET--C69-9     VARIABLE--NATSCI     NCOUNT-- 82
   STEM & LEAF NEEDS TO BE MULTIPLIED BY 10 TO THE  1 POWER.
       2
       2  66666
       2  444555
       2  2222222233333333
       2  000000011111
       1  888889999999999
       1  67777
       1  44444455555
       1  222222333
       1  111                    TO CONTINUE TYPE '1'?1
```

UNIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW

1. DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
2. QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

TECHNIQUES

3. BOX PLOT
4. STEM AND LEAF
5. EMPIRICAL PDF
6. SMOOTHED EMPIRICAL PDF
7. EMPIRICAL CDF
8. NORMAL PROBABILITY PLOT

ALTERATION

9. STANDARDIZATION
10. TRANSFORMATION(REEXPRESSION)
11. TRIMMING OF EXTREMES
12. SELECTION OF A NEW VARIABLE ; (SUMMARY STATISTICS)
13. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?3

BOX PLOT

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1'.?1

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

```
                                B O X   P L O T
DATA SET--C69-9                      VARIABLE--NATSCI                NCOUNT-- 82
     MAX          26
      !
      !
      !
      !
      !
  !--Q3---!       22
  !       !
  !       !
  !       !
  !--MED--!       19   MEAN =          18.890     SD =          4.2884
  !       !
  !       !
  !       !
  !       !
  !--Q1---!       15
      !
      !
      !
      !
     MIN          11              TO CONTINUE, TYPE '1'.?1
```

```
                UNIVARIATE EXPLORATORY DATA ANALYSIS

     OPTIONS:

   OVERVIEW
         1.  DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
         2.  QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

   TECHNIQUES
         3.  BOX PLOT
         4.  STEM AND LEAF
         5.  EMPIRICAL PDF
         6.  SMOOTHED EMPIRICAL PDF
         7.  EMPIRICAL CDF
         8.  NORMAL PROBABILITY PLOT

   ALTERATION
         9.  STANDARDIZATION
        10.  TRANSFORMATION(REEXPRESSION)
        11.  TRIMMING OF EXTREMES
        12.  SELECTION OF A NEW VARIABLE ; (SUMMARY STATISTICS)
        13.  RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

                  TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?12
```

```
                UNIVARIATE EXPLORATORY DATA ANALYSIS

  YOU NOW ARE ASKED TO CHOOSE THE VARIABLE YOU WANT TO EXAMINE
  WITH EXPLORATORY DATA ANALYSIS TECHNIQUES.

  YOU CAN SEE THE SUMMARY STATISTICS OF ALL THE VARIABLES
  IN YOUR PERSONAL FILE  BEFORE THE SELECTION, IF NECESSARY.


  THE DATA SET IN YOUR PERSONAL FILE IS NAMED C69-9   .

   YOU HAVE CURRENTLY SELECTED VARIABLE # 3    NAMED  NATSCI .

  TO SEE SUMMARY STATISTICS,     TYPE '2'.
  TO CONTINUE,                   TYPE '1'.
  ELSE,                          TYPE '0'.?1
```

```
YOU HAVE THE FOLLOWING VARIABLES IN YOUR PERSONAL FILE:

VARIABLE  1    IS ENGLSH
VARIABLE  2    IS  MATH
VARIABLE  3    IS NATSCI
VARIABLE  4    IS SOCSCI
VARIABLE  5    IS   GPA

TO SELECT A VARIABLE TYPE ITS NUMBER.?4
```

```
                UNIVARIATE EXPLORATORY DATA ANALYSIS

     OPTIONS:

   OVERVIEW
        1.  DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
        2.  QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

   TECHNIQUES
        3.  BOX PLOT
        4.  STEM AND LEAF
        5.  EMPIRICAL PDF
        6.  SMOOTHED EMPIRICAL PDF
        7.  EMPIRICAL CDF
        8.  NORMAL PROBABILITY PLOT

   ALTERATION
        9.  STANDARDIZATION
       10.  TRANSFORMATION(REEXPRESSION)
       11.  TRIMMING OF EXTREMES
       12.  SELECTION OF A NEW VARIABLE ; (SUMMARY STATISTICS)
       13.  RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

                 TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?4
```

STEM--AND--LEAF

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1' TO CONTINUE ?1

THERE WILL BE A SLIGHT PAUSE FOR CALCULATION.

```
STEM AND LEAF       DATA SET--C69-9     VARIABLE--SOCSCI     NCOUNT--102
     STEM & LEAF NEEDS TO BE MULTIPLIED BY 10 TO THE  1 POWER.
           3
           3  3
           3  111
           2  88888999
           2  66677
           2  444445555
           2  222222233
           2  00001111111
           1  88888889999
           1  667777777
           1  4444444444445555
           1  22222222333333
           1  01
           0  9
           0  6
           0  5
           0
           0  1                    TO CONTINUE TYPE '1'?1
```

UNIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. DESCRIPTION OF EXPLORATORY DATA TECHNIQUES(EDA)
2. QUESTIONS INVOLVED IN EDA AND APPROPRIATE TECHNIQUES

TECHNIQUES
3. BOX PLOT
4. STEM AND LEAF
5. EMPIRICAL PDF
6. SMOOTHED EMPIRICAL PDF
7. EMPIRICAL CDF
8. NORMAL PROBABILITY PLOT

ALTERATION
9. STANDARDIZATION
10. TRANSFORMATION(REEXPRESSION)
11. TRIMMING OF EXTREMES
12. SELECTION OF A NEW VARIABLE ; (SUMMARY STATISTICS)
13. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?0

COMPONENT 81. UNIVARIATE EXPLORATORY DATA ANALYSIS

MODEL 1. REGULAR CRT APPLICATIONS

TYPE THE NUMBER OF A MODEL OR '0'.?0

```
COMPONENT GROUP 8.  EXPLORATORY DATA ANALYSIS

81.  UNIVARIATE EXPLORATORY DATA ANALYSIS
82.  BIVARIATE EXPLORATORY DATA ANALYSIS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?82
```

```
     COMPONENT 82. BIVARIATE EXPLORATORY DATA ANALYSIS

    MODEL 1. REGULAR CRT APPLICATIONS

            TYPE THE NUMBER OF A MODEL; OTHERWISE '0'.?1
```

MODEL 1. REGULAR CRT APPLICATIONS OF BIVARIATE EDA

OVERVIEW MODULES
  1. OVERVIEW OF BIVARIATE EXPLORATORY DATA ANALYSIS(EDA)
  2. QUESTIONS IN BIVARIATE EDA AND ASSOCIATED TECHNIQUES

TECHNIQUE MODULES
  3. SUMMARY STATISTICS
  4. SCATTER PLOT
  5. SCHEMATIC PLOT
  6. UNIVARIATE EDA CONDITIONAL ON X
  7. CONDITIONAL EXPECTATION(REGRESSION) PLOT

ALTERATION MODULES
  8. STANDARDIZATION
  9. TRANSFORMATION(REEXPRESSION)
  10. TRIMMING
  11. SELECTION OF VARIABLES ;(SUMMARY STATISTICS)
  12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF A MODULE; OTHERWISE '0'.?11

BIVARIATE EXPLORATORY DATA ANALYSIS

YOU NOW ARE ASKED TO CHOOSE THE VARIABLES YOU WANT TO EXAMINE WITH EXPLORATORY DATA ANALYSIS TECHNIQUES.

YOU CAN SEE THE SUMMARY STATISTICS OF ALL THE VARIABLES IN YOUR PERSONAL FILE BEFORE THE SELECTION, IF NECESSARY.

THE DATA SET IN YOUR PERSONAL FILE IS NAMED C69-9 .

TO SEE SUMMARY STATISTICS,   TYPE '2'.
TO CONTINUE,   TYPE '1'.?1

```
YOU HAVE THE FOLLOWING VARIABLES IN YOUR PERSONAL FILE:

VARIABLE  1    IS ENGLSH
VARIABLE  2    IS  MATH
VARIABLE  3    IS NATSCI
VARIABLE  4    IS SOCSCI
VARIABLE  5    IS   GPA

TYPE THE NUMBER OF THE VARIABLE YOU WANT ON THE X-AXIS.?3

TYPE THE NUMBER OF THE VARIABLE YOU WANT ON THE Y-AXIS.?4
```

```
                 BIVARIATE EXPLORATORY DATA ANALYSIS

    OPTIONS:

  OVERVIEW
     1. OVERVIEW OF BIVARIATE EXPLORATORY DATA ANALYSIS(EDA)
     2. QUESTIONS IN BIVARIATE EDA AND ASSOCIATED TECHNIQUES

  TECHNIQUES
     3. SUMMARY STATISTICS
     4. SCATTER PLOT
     5. SCHEMATIC PLOT
     6. UNIVARIATE EDA CONDITIONAL ON X
     7. CONDITIONAL EXPECTATION(REGRESSION) PLOT

  ALTERATION
     8. STANDARDIZATION
     9. TRANSFORMATION(REXPRESSION)
    10. TRIMMING
    11. SELECTION OF NEW VARIABLES  ; (SUMMARY STATISTICS)
    12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

                TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?3
```

SUMMARY STATISTICS

TYPE '2' FOR AN EXPLANATION OR '1' TO CONTINUE.?1

SUMMARY STATISTICS

1. EXTREMES, QUARTILES, STANDARD DEVIATIONS, ETC.
2. VARIANCE/COVARIANCE MATRIX
3. CORRELATION MATRIX

TYPE THE NUMBER OF THE OPTION YOU WANT (EXIT=0).?1

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

HERE ARE THE DESCRIPTIVE/SUMMARY STATISTICS FOR YOUR DATA.

DATA SET = C69-9

	VARIABLES X	Y
N= 102	NATSCI	SOCSCI
SMALLEST	3.00	1.00
LARGEST	30.00	33.00
Q1	14.00	14.00
Q2=MEDIAN	19.00	18.00
Q3	23.00	24.00
MEAN	18.65	18.91
ST.DEV.	5.92	6.23
VARIANCE	35.07	38.85
Q3-Q1	9.00	10.00

WHEN YOU ARE READY TO CONTINUE TYPE '1'.?1

TYPE THE NUMBER OF THE OPTION YOU WANT.

1. EXTREMES, QUARTILES, STANDARD DEVIATIONS, ETC.
2. VARIANCE/COVARIANCE MATRIX
3. CORRELATION MATRIX

TYPE THE NUMBER OF THE OPTION YOU WANT (EXIT=0).?0

BIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

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TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?4

BIVARIATE SCATTER PLOT

FOR AN EXPLANATION TYPE '2', OTHERWISE TYPE '1' TO CONTINUE.?1

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

```
     33.00!                                       1
          !                             2   1
          !                             2     1
          !                       1     1     3 1 1
          !                         1         2
          !                 1   1       3 1   3
          !                 1     3 1   2   1     1
          !           1     2     1 1   1     1
S         !                 2     1 1 2   1 1
O         !           1 2   1     2     1
C    17.00!         1 1   1   1   2 1 1       1
S         ! 1         1 2 1 2   2 3 1 2 1
C         !         2       1     1     2
I         !       2   1 1 1 1   1       1 1
          !             1
          !                       1
          !                         1
          !   1
          !
      1.00!     1
          !-+-----------------+-------------------+      NCOUNT--102
           3.00              16.50               30.00
                             NATSCI                       C69-9
& = 10-19  * = 20-29  $ >= 30          TYPE '1' TO CONTINUE.?1
```

BIVARIATE EXPLORATORY DATA ANALYSIS

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ALTERATION
8. STANDARDIZATION
9. TRANSFORMATION(REXPRESSION)
10. TRIMMING
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12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?5

SCHEMATIC PLOT   (PARALLEL SCHEMATIC PLOTS)

FOR AN EXPLANATION TYPE '2', OTHERWISE TYPE '1' TO CONTINUE.?1

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

```
S C H E M A T I C   P L O T  (PARALLEL BOX PLOTS)      NCOUNT -- 102
DATA SET--C69-9        X-VARIABLE--NATSCI          Y-VARIABLE--SOCSCI
 33                !                                       !
 31.4              !                                       !
 29.8              !                             !         !
 28.2              !                             !     +---+---+
 26.6              !                   !         !     !       !
 25.           +---+---+               !         !     +-------+
 23.4          !       !               !     +---+---+ !       !
 21.8          !       !     !         !     +-------+ +---+---+
 20.2          +-------+     !     +---+---+ !       !     !
 18.6          !       !     !     !       ! !       !     !
 17.           !       ! +---+---+ +-------+ !       !     !
 15.4          +---+---+ +-------+ +---+---+ +---+---+     !
 13.8              !     !       !     !         !         !
 12.2              !     +---+---+     !         !         !
 10.6              !         !         !         !
 9                 !         !                   !
 7.4               !         !                   !
 5.8               !         !
 4.2               !         !
 2.6               !         !
               X-VAR    Y(...Q1)  Y(Q1..Q2) Y(Q2..Q3)  Y(Q3...)
                                             TO CONTINUE , TYPE '1'?1
```

SUMMARY STATISTICS

	X-VAR	Y(...Q1)	Y(Q1..Q2)	Y(Q2..Q3)	Y(Q3...)
MAXIMUM	30.000	22.000	27.000	31.000	33.000
Q3	23.000	17.000	20.000	23.000	28.000
MEDIAN	19.000	14.000	17.000	20.500	25.000
MEAN	18.647	14.200	17.320	19.577	24.308
Q1	14.000	12.000	14.000	15.000	21.000
MINIMUM	3.000	1.000	9.000	6.000	12.000
S.D.	5.922	4.561	4.487	5.746	5.165

TO REVIEW,   TYPE '2'
TO CONTINUE , TYPE '1'?1

BIVARIATE EXPLORATORY DATA ANALYSIS

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ALTERATION
8. STANDARDIZATION
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10. TRIMMING
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12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?6

```
BIVARIATE CONDITIONALS

     TYPE '2' FOR AN EXPLANATION OR '1' TO CONTINUE.?1


THERE WILL BE SHORT PAUSE FOR CALCULATION.
```

```
DIVARIATE CONDITIONALS

     YOU MUST SPECIFY THE INTERVAL ON X THAT YOU WANT TO
          CONDITIONALIZE ON.  THIS WILL GIVE YOU A SET OF
           Y VALUES TO EXAMINE.

THE VARIABLE ON THE X-AXIS IS NATSCI
THE VARIABLE ON THE Y AXIS IS SOCSCI

    NCOUNT = 102

    LOW X VALUE = 3
   HIGH X VALUE = 30

ENTER THE INTERVAL ON X YOU WISH TO EXAMINE SEPARATED BY A COMMA.
SMALLEST,LARGEST('0','0' TO EXIT)=?1,19
```

BIVARIATE CONDITIONALS

YOU NOW SELECT THE OPTION YOU WANT.

CONDITIONAL OPTIONS:

1. BOX PLOT
2. STEM AND LEAF
3. EMPIRICAL PDF
4. SMOOTHED EPDF
5. EMPIRICAL CDF
6. NORMAL PROBABILITY PLOT

TYPE THE NUMBER OF THE OPTION OR '0' TO EXIT.?1

BOX PLOT

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1'.?1

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

```
                    B O X   P L O T
DATA SET--C69-9          VARIABLE--SOCSCI          NCOUNT-- 53
      CONDITIONAL ON NATSCI FROM  1     TO  19
    MAX         27
     !
     !
     !
     !
     !
     !
  !--Q3---!     19
  !       !
  !       !
  !--MED--!     15   MEAN =       15.943   SD =       4.7837
  !--Q1---!     13
     !
     !
     !
     !
     !
     !
     !
     !
    MIN         1             TO CONTINUE, TYPE '1'.?1




                    BIVARIATE CONDITIONALS

YOU NOW SELECT THE OPTION YOU WANT.

     CONDITIONAL OPTIONS:

      1.   BOX PLOT
      2.   STEM AND LEAF
      3.   EMPIRICAL PDF
      4.   SMOOTHED EPDF
      5.   EMPIRICAL CDF
      6.   NORMAL PROBABILITY PLOT

      TYPE THE NUMBER OF THE OPTION OR '0' TO EXIT.?2
```

STEM--AND--LEAF

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1' TO CONTINUE.?1

THERE WILL BE A SLIGHT PAUSE FOR CALCULATION.

```
STEM AND LEAF       DATA SET--C69-9      VARIABLE--SOCSCI     NCOUNT-- 53
    STEM & LEAF NEEDS TO BE MULTIPLIED BY 10 TO THE  1 POWER.
    CONDITIONAL ON NATSCI FROM 1       TO 19
         2
         2  7
         2  45
         2  2222
         2  001111
         1  8888889
         1  677777
         1  444444444445
         1  2222223333
         1  01
         0  9
         0
         0  5
         0
         0  1                    TO CONTINUE TYPE '1'?1
```

BIVARIATE CONDITIONALS

YOU NOW SELECT THE OPTION YOU WANT.

CONDITIONAL OPTIONS:

1. BOX PLOT
2. STEM AND LEAF
3. EMPIRICAL PDF
4. SMOOTHED EPDF
5. EMPIRICAL CDF
6. NORMAL PROBABILITY PLOT

TYPE THE NUMBER OF THE OPTION OR '0' TO EXIT.?0

THERE WILL BE A SHORT PAUSE.

BIVARIATE EXPLORATORY DATA ANALYSIS

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ALTERATION
8. STANDARDIZATION
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TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?7

BIVARIATE CONDITIONAL EXPECTATION PLOT

TYPE '2' FOR AN EXPLANATION OR '1' TO CONTINUE.?1

THERE WILL BE A SHORT PAUSE FOR CALCULATIONS.

```
ENTER THE NUMBER OF INTERVALS YOU WANT ON THE X-AXIS.  YOU
MUST HAVE AT LEAST 10 INTERVALS AND NOT MORE THAN 60.
               OTHERWISE '0' TO EXIT.?30


THERE WILL BE A SHORT PAUSE FOR CALCULATION.
```

```
          33.0!
              !                           2
              !
              !                         41
              !
              !                       37
              !                     8
    S         !                    8       1
    O         !           6     %
    C         !            51    7   3
    S    17.0!       23     4    5
    C         !1     3  63      5
    I         !     2
              !
              !
              !
              !
              !  1
              !
           1.0!   1
              !------------------------NATSCI
            3.00                            31.00
 (%=10-19 *=20-29 $>=30)   DATA SET-C69-9   NCOUNT=102   # OF INTVLS=30
     TYPE '2' TO RESPECIFY NUMBER OF INTERVALS OR '1' TO CONTINUE.?2
```

ENTER THE NUMBER OF INTERVALS YOU WANT ON THE X-AXIS. YOU
MUST HAVE AT LEAST 10 INTERVALS AND NOT MORE THAN 60.
OTHERWISE '0' TO EXIT.?10

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

```
      33.0!
          !
          !
          !         3
          !
          !        &
          !       &
S         !
O         !      *
C         !     &
S     17.0!  8&&
C         !
I         !
          !
          !2
          ! 3
          !
          !
          !
       1.0!
          !----NATSCI
        3.00       31.00
(&=10-19 *=20-29 $>=30)   DATA SET-C69-9   NCOUNT=102   # OF INTVLS=10
   TYPE '2' TO RESPECIFY NUMBER OF INTERVALS OR '1' TO CONTINUE.?1
```

```
              BIVARIATE EXPLORATORY DATA ANALYSIS

    OPTIONS:

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    1. OVERVIEW OF BIVARIATE EXPLORATORY DATA ANALYSIS(EDA)
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    7. CONDITIONAL EXPECTATION(REGRESSION) PLOT

 ALTERATION
    8. STANDARDIZATION
    9. TRANSFORMATION(REXPRESSION)
   10. TRIMMING
   11. SELECTION OF NEW VARIABLES  ; (SUMMARY STATISTICS)
   12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

               TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?8
```

```
     BIVARIATE STANDARDIZATION

          TYPE '2' FOR AN EXPLANATION OR '1' TO CONTINUE.?1


               MEAN              STANDARD DEVIATION

NATSCI         18.647                 5.92
SOCSCI         18.912                 6.23

YOUR VARIABLES WILL NOW BE STANDARDIZED.  TO RETRIEVE YOUR
ORIGINAL DATA YOU MUST CHOOSE THE APPROPRIATE MODULE IN THE
MODULE LIST (11 OR 12).
                    TO ANALYZE STANDARDIZED DATA,  TYPE '1'.
                    TO CANCEL THE STANDARDIZATION, TYPE '0'.?1
```

BIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

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  10. TRIMMING
  11. SELECTION OF NEW VARIABLES ; (SUMMARY STATISTICS)
  12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?4

BIVARIATE SCATTER PLOT

FOR AN EXPLANATION TYPE '2', OTHERWISE TYPE '1' TO CONTINUE.?1

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

```
       2.26!                                       1
           !                             2   1
           !                             2     1
           !                       1     1     3 1 1
           !                         1         2
           !                 1   1       3 1   3
           !                 1     3 1   2   1     1
           !           1     2     1 1   1     1
S          !                 2     1 1 2   1 1
O          !           1 2   1     2     1
C     -0.31!         1 1   1   1   2 1 1       1
S          ! 1         1 2 1 2   2 3 1 2 1
C          !         2       1     1     2
I          !       2   1 1 1 1   1       1 1
           !             1
           !                       1
           !                         1
           !   1
           !
      -2.87!     1
           !-+-----------------+-------------------+       NCOUNT--102
           -2.64            -0.36                1.92
                             NATSCI                        C69-9
 & = 10-19  * = 20-29  $ >= 30          TYPE '1' TO CONTINUE.?1
```

BIVARIATE EXPLORATORY DATA ANALYSIS

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TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?12

RETRIEVAL OF ORIGINAL DATA

THE DATA SET IS NAMED C69-9

VARIABLE ON X-AXIS IS NATSCI
VARIABLE ON Y-AXIS IS SOCSCI

NCOUNT = 102

TYPE '1' TO CONTINUE.?1

BIVARIATE EXPLORATORY DATA ANALYSIS

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TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?9

BIVARIATE TRANSFORMATION(REEXPRESSION)

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1'.?1

BIVARIATE TRANSFORMATION

TYPE '1' TO TRANSFORM NATSCI (X-VAR) OR '0' TO LEAVE IT UNCHANGED.?1

```
THIS MODULE ALLOWS THE FOLLOWING TRANSFORMATIONS:

 1.  POWER    -- Z=A*( (X+C)**P )              P IS THE POWER.
 2.   LOG     -- Z=A*( LOG(X+C)/LOG(B) )       B IS THE BASE OF LOG.
 3.  LOG-ODDS-- Z=LOG((X-A)/(B-X))/LOG(C)      C IS THE BASE OF LOG.
 4.  ARCSIN   -- Z=ASIN(SQRT(X/N))             ARCSIN OF ROOT X/N
 5.   RANK    -- Z=LOG((I-1/3)/(N-I+2/3))      I IS RANK.

NOTATION:   X IS OBSERVATION.
            Z IS NEW VALUE.
            A,B,C, AND P  ARE USER SPECIFIED CONSTANTS.
            I IS A RANK.
            N IS THE NUMBER OF OBSERVATIONS.
            LOG IN THE RANK TRANSFORMATION IS THE COMMON LOGARITHM.

NOTE:     TO GET THE GRAPHICAL REPRESENTATION OF THE TRANSFORMATION,
         SELECT THE SAME VARIABLES FOR BOTH AXES,USE SCATTER PLOT
         MODULE (4) AFTER TRANSFORMING Y-AXIS VARIABLE.

          THE TRANSFORMED DATA WILL REPLACE THE ORIGINAL DATA UNTIL
         YOU SELECT ANOTHER VARIABLE SET (MODULE 11) OR YOU RETRIEVE
         THE ORIGINAL VARIABLE SET (MODULE 12).

   TYPE THE NUMBER OF THE TRANSFORMATION YOU WANT OR '0' TO EXIT.?3




DATA SET NAME = C69-9   VARIABLE NAME = NATSCI (X-VAR)


LOG-ODDS TRANSFORMATION   Z=LOG((X-A)/(B-X))/LOG(C)


ENTER THE BASE OF LOG.?10

ENTER THE CONSTANTS A AND B FOR THE LOG-ODDS TRANSFORMATION.
 A  <  3      AND    B  >  30      OR,
 A  >  30     AND    B  <  3          .?2,31


THE TRANSFORMATION OF NATSCI (X-VAR) HAS NOW BEEN COMPLETED.

                               TO CONTINUE, TYPE '1'.?1

TYPE '1' TO TRANSFORM SOCSCI (Y-VAR) OR '0' TO LEAVE IT UNCHANGED.?1
```

```
THIS MODULE ALLOWS THE FOLLOWING TRANSFORMATIONS:

 1.  POWER    -- Z=A*( (X+C)**P )              P IS THE POWER.
 2.   LOG     -- Z=A*( LOG(X+C)/LOG(B) )       B IS THE BASE OF LOG.
 3.  LOG-ODDS-- Z=LOG((X-A)/(B-X))/LOG(C)      C IS THE BASE OF LOG.
 4.  ARCSIN   -- Z=ASIN(SQRT(X/N))             ARCSIN OF ROOT X/N
 5.   RANK    -- Z=LOG((I-1/3)/(N-I+2/3))      I IS RANK.

NOTATION:    X IS OBSERVATION.
             Z IS NEW VALUE.
             A,B,C, AND P  ARE USER SPECIFIED CONSTANTS.
             I IS A RANK.
             N IS THE NUMBER OF OBSERVATIONS.
             LOG IN THE RANK TRANSFORMATION IS THE COMMON LOGARITHM.

NOTE:     TO GET THE GRAPHICAL REPRESENTATION OF THE TRANSFORMATION,
        SELECT THE SAME VARIABLES FOR BOTH AXES,USE SCATTER PLOT
        MODULE (4) AFTER TRANSFORMING Y-AXIS VARIABLE.

         THE TRANSFORMED DATA WILL REPLACE THE ORIGINAL DATA UNTIL
        YOU SELECT ANOTHER VARIABLE SET (MODULE 11) OR YOU RETRIEVE
        THE ORIGINAL VARIABLE SET (MODULE 12).

   TYPE THE NUMBER OF THE TRANSFORMATION YOU WANT OR '0' TO EXIT.?3



DATA SET NAME = C69-9   VARIABLE NAME = SOCSCI (Y-VAR)


LOG-ODDS TRANSFORMATION   Z=LOG((X-A)/(B-X))/LOG(C)


ENTER THE BASE OF LOG.?10

ENTER THE CONSTANTS A AND B FOR THE LOG-ODDS TRANSFORMATION.
 A  <  1       AND    B  >  33      OR,
 A  >  33      AND    B  <  1          .?0,34


THE TRANSFORMATION OF SOCSCI (Y-VAR) HAS NOW BEEN COMPLETED.

                                 TO CONTINUE, TYPE '1'.?1
```

THE TRANSFORMATION HAS NOW BEEN COMPLETED.

YOUR TRANSFORMED DATA WILL REPLACE YOUR ORIGINAL DATA.
TO RETRIEVE YOUR ORIGINAL DATA YOU MUST SELECT
THE APPROPRIATE OPTION IN THE OPTION LIST (11 OR 12).

TO ANALYZE TRANSFORMED DATA, TYPE '1'.
TO CANCEL THE TRANSFORMATION, TYPE '0'.?1

BIVARIATE EXPLORATORY DATA ANALYSIS

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ALTERATION
8. STANDARDIZATION
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TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?4

BIVARIATE SCATTER PLOT

FOR AN EXPLANATION TYPE '2', OTHERWISE TYPE '1' TO CONTINUE.?1

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

```
    1.52!                                   1
        !
        !
        !                         2   1
        !                         2     1
        !                             1 2 1 1
        !                       2 1   2
        !                 1   1 1 4 1 2 1
S       !               1 2 2 1 7 2   2         1
O       !               1 3 1   3 1 1 1
C  -0.00!             1 1 2 1   6 1   1
S       ! 1         2 2 2 6 2 5 2 3 1
C       !                 1   2
I       !
        !                       1
        !       1
        !
        !
        !
   -1.52!         1
        !-+-----------------+-------------------+       NCOUNT--102
        -1.45              0.00                1.45
                          NATSCI                        C69-9
& = 10-19   * = 20-29   $ >= 30          TYPE '1' TO CONTINUE.?1
```

```
                    BIVARIATE EXPLORATORY DATA ANALYSIS

    OPTIONS:

  OVERVIEW
     1. OVERVIEW OF BIVARIATE EXPLORATORY DATA ANALYSIS(EDA)
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  TECHNIQUES
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     5. SCHEMATIC PLOT
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     7. CONDITIONAL EXPECTATION(REGRESSION) PLOT

  ALTERATION
     8. STANDARDIZATION
     9. TRANSFORMATION(REXPRESSION)
    10. TRIMMING
    11. SELECTION OF NEW VARIABLES  ; (SUMMARY STATISTICS)
    12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

                    TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?5



SCHEMATIC PLOT   (PARALLEL SCHEMATIC PLOTS)

    FOR AN EXPLANATION TYPE '2', OTHERWISE TYPE '1' TO CONTINUE.?1

 THERE WILL BE A SHORT PAUSE FOR CALCULATION.
```

```
S C H E M A T I C   P L O T  (PARALLEL BOX PLOTS)     NCOUNT-- 102
DATA SET--C69-9        X-VARIABLE--NATSCI          Y-VARIABLE--SOCSCI
 1.51851            !                                           !
 1.36666            !                                           !
 1.21481            !                                           !
 1.06296            !                                           !
 .911108            !                                !          !
 .759257            !                                !      +---+---+
 .607405            !                                !      !       !
 .455554        +---+---+                 !      +---+---+  +-------+
 .303703        +-------+             +---+---+  +-------+  +---+---+
 .151851        !       !      !      !       !  !       !      !
 0              !       !  +---+---+  +-------+  +---+---+      !
-.151851        +---+---+  +---+---+  +---+---+      !          !
-.303703            !          !          !          !
-.455554            !          !                     !
-.607406            !          !                     !
-.759257            !          !
-.911108            !          !
-1.06296            !          !
-1.21481            !          !
-1.36666            !          !
                X-VAR      Y(...Q1)   Y(Q1..Q2)  Y(Q2..Q3)   Y(Q3...)
                                                 TO CONTINUE , TYPE '1'?1
```

SUMMARY STATISTICS

	X-VAR	Y(...Q1)	Y(Q1..Q2)	Y(Q2..Q3)	Y(Q3...)
MAXIMUM	1.447	0.263	0.586	1.014	1.519
Q3	0.419	-0.000	0.155	0.320	0.669
MEDIAN	0.151	-0.155	-0.000	0.182	0.444
MEAN	0.152	-0.180	0.020	0.153	0.465
Q1	-0.151	-0.263	-0.155	-0.103	0.208
MINIMUM	-1.447	-1.519	-0.444	-0.669	-0.263
S.D.	0.449	0.344	0.245	0.348	0.381

TO REVIEW,   TYPE '2'
TO CONTINUE , TYPE '1'?1

BIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. OVERVIEW OF BIVARIATE EXPLORATORY DATA ANALYSIS(EDA)
2. QUESTIONS IN BIVARIATE EDA AND ASSOCIATED TECHNIQUES

TECHNIQUES
3. SUMMARY STATISTICS
4. SCATTER PLOT
5. SCHEMATIC PLOT
6. UNIVARIATE EDA CONDITIONAL ON X
7. CONDITIONAL EXPECTATION(REGRESSION) PLOT

ALTERATION
8. STANDARDIZATION
9. TRANSFORMATION(REXPRESSION)
10. TRIMMING
11. SELECTION OF NEW VARIABLES ; (SUMMARY STATISTICS)
12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?12

RETRIEVAL OF ORIGINAL DATA

THE DATA SET IS NAMED C69-9

VARIABLE ON X-AXIS IS NATSCI
VARIABLE ON Y-AXIS IS SOCSCI

NCOUNT = 102

TYPE '1' TO CONTINUE.?1

693

BIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. OVERVIEW OF BIVARIATE EXPLORATORY DATA ANALYSIS(EDA)
2. QUESTIONS IN BIVARIATE EDA AND ASSOCIATED TECHNIQUES

TECHNIQUES
3. SUMMARY STATISTICS
4. SCATTER PLOT
5. SCHEMATIC PLOT
6. UNIVARIATE EDA CONDITIONAL ON X
7. CONDITIONAL EXPECTATION(REGRESSION) PLOT

ALTERATION
8. STANDARDIZATION
9. TRANSFORMATION(REXPRESSION)
10. TRIMMING
11. SELECTION OF NEW VARIABLES ; (SUMMARY STATISTICS)
12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?10

BIVARIATE TRIMMING OF OUTLIERS

IF YOU WANT AN EXPLANATION TYPE '2', ELSE '1'.?1

TRIMMING FOR X-AXIS

DATA SET --C69-9   VARIABLE --NATSCI

INPUT THE PERCENT TRIMMING OFF EACH END YOU WISH.
MAXIMUM TRIMMING ALLOWED IS 15 PERCENT.

INPUT PERCENT FOR LOWER TAIL(0 THROUGH 15).?10

NEXT INPUT PERCENT FOR UPPER TAIL(0 THROUGH 15).?10

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

THE TRIMMING HAS NOW BEEN COMPLETED. THE TRIMMED DATA WILL NOW REPLACE THE ORIGINAL DATA YOU HAVE CHOSEN TO EXAMINE. YOU CAN RETRIEVE YOUR ORIGINAL DATA BY CHOOSING THE APPROPRIATE MODULE IN THE MODULE LIST (11 OR 12).

DATA SET -- C69-9
X VARIABLE -- NATSCI
Y VARIABLE -- SOCSCI

NEW NCOUNT = 82

TYPE '1' TO TRIM WITH RESPECT TO THE Y VARIABLE ELSE '0'.?1

700

```
TRIMMING FOR Y AXIS

** BE SURE THAT THE PERCENTILE VALUES YOU ARE GOING TO SPECIFY ARE
CONDITIONAL ON THE TRIMMED DATA WITH RESPECT TO THE X-VARIABLE. **

 DATA SET --C69-9      VARIABLE --SOCSCI

INPUT THE PERCENT TRIMMING OFF EACH END YOU WISH.
     MAXIMUM TRIMMING ALLOWED IS 15 PERCENT.

INPUT PERCENT FOR LOWER TAIL(0 THROUGH 15).?5

NEXT INPUT PERCENT FOR UPPER TAIL(0 THROUGH 15).?5

 THERE WILL BE A SHORT PAUSE FOR CALCULATION.


THE TRIMMING HAS NOW BEEN COMPLETED.  THE TRIMMED DATA WILL
NOW REPLACE THE ORIGINAL DATA YOU HAVE CHOSEN TO EXAMINE.  YOU
CAN RETRIEVE YOUR ORIGINAL DATA BY CHOOSING THE APPROPRIATE
MODULE IN THE MODULE LIST (11 OR 12).

DATA SET -- C69-9
X VARIABLE -- NATSCI
Y VARIABLE -- SOCSCI

    NEW NCOUNT = 74

                                  TO ANALYZE TRIMMED DATA, TYPE '1'.
                                  TO CANCEL THE TRIMMING,  TYPE '0'.?1
```

BIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
   1. OVERVIEW OF BIVARIATE EXPLORATORY DATA ANALYSIS(EDA)
   2. QUESTIONS IN BIVARIATE EDA AND ASSOCIATED TECHNIQUES

TECHNIQUES
   3. SUMMARY STATISTICS
   4. SCATTER PLOT
   5. SCHEMATIC PLOT
   6. UNIVARIATE EDA CONDITIONAL ON X
   7. CONDITIONAL EXPECTATION(REGRESSION) PLOT

ALTERATION
   8. STANDARDIZATION
   9. TRANSFORMATION(REXPRESSION)
  10. TRIMMING
  11. SELECTION OF NEW VARIABLES ; (SUMMARY STATISTICS)
  12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?4

BIVARIATE SCATTER PLOT

FOR AN EXPLANATION TYPE '2', OTHERWISE TYPE '1' TO CONTINUE.?1

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

```
       29.00!                             1
            !
            !                     1         1
            !                       1               1
            !               1               2       1
            !       1                     1     1   1
            !
            !                       1     1
S           !       1           3         1       1
O           !       1   1       1 1       1         1
C      20.50!           1     1   1   1
S           !       1                   1       1 1
C           ! 1 2       1       2         1
I           !
            ! 1   1     1       2 1                 1
            !                         1
            !       1             1   1   1
            ! 1 2 1     1   2   2 1   1
            !       1         1         1 1
       12.00!   1 1     1                 1     1
            !-+-----------------+-------------------+        NCOUNT-- 74
             11.00             18.50               26.00
                               NATSCI                        C69-9
& = 10-19  * = 20-29  $ >= 30            TYPE '1' TO CONTINUE.?1
```

```
                BIVARIATE EXPLORATORY DATA ANALYSIS

   OPTIONS:

OVERVIEW
   1. OVERVIEW OF BIVARIATE EXPLORATORY DATA ANALYSIS(EDA)
   2. QUESTIONS IN BIVARIATE EDA AND ASSOCIATED TECHNIQUES

TECHNIQUES
   3. SUMMARY STATISTICS
   4. SCATTER PLOT
   5. SCHEMATIC PLOT
   6. UNIVARIATE EDA CONDITIONAL ON X
   7. CONDITIONAL EXPECTATION(REGRESSION) PLOT

ALTERATION
   8. STANDARDIZATION
   9. TRANSFORMATION(REXPRESSION)
  10. TRIMMING
  11. SELECTION OF NEW VARIABLES : (SUMMARY STATISTICS)
  12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

                TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?11
```

```
BIVARIATE EXPLORATORY DATA ANALYSIS

YOU NOW ARE ASKED TO CHOOSE THE VARIABLES YOU WANT TO EXAMINE
WITH EXPLORATORY DATA ANALYSIS TECHNIQUES.

YOU CAN SEE THE SUMMARY STATISTICS OF ALL THE VARIABLES
IN YOUR PERSONAL FILE BEFORE THE SELECTION, IF NECESSARY.


THE DATA SET IN YOUR PERSONAL FILE IS NAMED  C69-9  .

 YOU HAVE CURRENTLY SELECTED VAR # 3    NAMED  NATSCI  FOR X-AXIS,
                         AND VAR # 4    NAMED  SOCSCI  FOR Y-AXIS.


TO SEE SUMMARY STATISTICS,       TYPE '2'.
TO CONTINUE,                     TYPE '1'.
ELSE,                            TYPE '0'.?1
```

```
YOU HAVE THE FOLLOWING VARIABLES IN YOUR PERSONAL FILE:

VARIABLE  1    IS ENGLSH
VARIABLE  2    IS  MATH
VARIABLE  3    IS NATSCI
VARIABLE  4    IS SOCSCI
VARIABLE  5    IS   GPA

TYPE THE NUMBER OF THE VARIABLE YOU WANT ON THE X-AXIS.?2

TYPE THE NUMBER OF THE VARIABLE YOU WANT ON THE Y-AXIS.?5
```

BIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. OVERVIEW OF BIVARIATE EXPLORATORY DATA ANALYSIS(EDA)
2. QUESTIONS IN BIVARIATE EDA AND ASSOCIATED TECHNIQUES

TECHNIQUES
3. SUMMARY STATISTICS
4. SCATTER PLOT
5. SCHEMATIC PLOT
6. UNIVARIATE EDA CONDITIONAL ON X
7. CONDITIONAL EXPECTATION(REGRESSION) PLOT

ALTERATION
8. STANDARDIZATION
9. TRANSFORMATION(REXPRESSION)
10. TRIMMING
11. SELECTION OF NEW VARIABLES ; (SUMMARY STATISTICS)
12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?4

BIVARIATE SCATTER PLOT

FOR AN EXPLANATION TYPE '2', OTHERWISE TYPE '1' TO CONTINUE.?1

THERE WILL BE A SHORT PAUSE FOR CALCULATION.

```
       3.80!                                   1   1
           !                   1 2     1       1
           !                   3             2 1
           !                           1
           !       1   1     1 1 1 1 1             1
           !     1           1 1 1   2 1   2 2     1
           !           1 2 1   1       1   2     1
           !                 1 1 2 8 1   1   2 1
           !               2   2   1       1
           !               1   1       1 1     1
G      1.90! 1         1   1 1 1   1   2
P          !               1       1           1
A          !     1     2         1     1
           !               1 2   1
           !           1       1             1
           !               1   1         1
           !               2
           !
           !                 1     1
       0.00!                 1
           !-+-----------------+-------------------+      NCOUNT--102
            1.00             16.00               31.00
                              MATH                        C69-9
$ = 10-19   * = 20-29   $ >= 30         TYPE '1' TO CONTINUE.?1
```

BIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. OVERVIEW OF BIVARIATE EXPLORATORY DATA ANALYSIS(EDA)
2. QUESTIONS IN BIVARIATE EDA AND ASSOCIATED TECHNIQUES

TECHNIQUES
3. SUMMARY STATISTICS
4. SCATTER PLOT
5. SCHEMATIC PLOT
6. UNIVARIATE EDA CONDITIONAL ON X
7. CONDITIONAL EXPECTATION(REGRESSION) PLOT

ALTERATION
8. STANDARDIZATION
9. TRANSFORMATION(REXPRESSION)
10. TRIMMING
11. SELECTION OF NEW VARIABLES ! (SUMMARY STATISTICS)
12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?5

```
SCHEMATIC PLOT   (PARALLEL SCHEMATIC PLOTS)

     FOR AN EXPLANATION TYPE '2', OTHERWISE TYPE '1' TO CONTINUE.?1

 THERE WILL BE A SHORT PAUSE FOR CALCULATION.
```

```
S C H E M A T I C   P L O T  (PARALLEL BOX PLOTS)      NCOUNT-- 102
DATA SET--C69-9          X-VARIABLE-- MATH          Y-VARIABLE--  GPA
 3.8               !                                         !
 3.61              !                                         !
 3.42              !                     !          !        !
 3.23              !                     !          !        !
 3.04              !                 +---+---+      !    +---+---+
 2.85              !          !      !       !  +---+---+ !       !
 2.66          +---+---+ +---+---+   !       !  !       ! +-------+
 2.47          !       ! !       !   +-------+  +-------+ +---+---+
 2.28          !       ! !       !   !       !  !       !     !
 2.09          +-------+ !       !   !       !  +---+---+     !
 1.9           !       ! +-------+   +---+---+      !        !
 1.71          +---+---+ !       !       !          !        !
 1.52              !     !       !       !          !        !
 1.33              !     +---+---+       !          !        !
 1.14              !          !          !          !        !
 .95               !          !          !          !        !
 .76               !          !          !          !
 .57               !          !          !          !
 .38               !          !          !          !
 .19               !          !
               X-VAR     Y(...Q1)   Y(Q1..Q2)  Y(Q2..Q3)  Y(Q3...)
                                               TO CONTINUE , TYPE '1'?1
```

SUMMARY STATISTICS

	X-VAR	Y(...Q1)	Y(Q1..Q2)	Y(Q2..Q3)	Y(Q3...)
MAXIMUM	31.000	3.000	3.600	3.600	3.800
Q3	22.000	2.600	2.900	2.800	3.000
MEDIAN	17.000	1.900	2.300	2.400	2.550
MEAN	18.108	1.832	2.288	2.354	2.588
Q1	14.000	1.300	1.800	2.000	2.300
MINIMUM	1.000	0.000	0.200	0.200	0.800
S.D.	6.079	0.793	0.897	0.679	0.720

TO REVIEW, TYPE '2'
TO CONTINUE , TYPE '1'?1

BIVARIATE EXPLORATORY DATA ANALYSIS

OPTIONS:

OVERVIEW
1. OVERVIEW OF BIVARIATE EXPLORATORY DATA ANALYSIS(EDA)
2. QUESTIONS IN BIVARIATE EDA AND ASSOCIATED TECHNIQUES

TECHNIQUES
3. SUMMARY STATISTICS
4. SCATTER PLOT
5. SCHEMATIC PLOT
6. UNIVARIATE EDA CONDITIONAL ON X
7. CONDITIONAL EXPECTATION(REGRESSION) PLOT

ALTERATION
8. STANDARDIZATION
9. TRANSFORMATION(REXPRESSION)
10. TRIMMING
11. SELECTION OF NEW VARIABLES ; (SUMMARY STATISTICS)
12. RETRIEVAL OF ORIGINAL DATA(AFTER ALTERATION)

TYPE THE NUMBER OF THE OPTION YOU WISH OR '0'.?0

COMPONENT 82. BIVARIATE EXPLORATORY DATA ANALYSIS

MODEL 1. REGULAR CRT APPLICATIONS

TYPE THE NUMBER OF A MODEL; OTHERWISE '0'.?0

COMPONENT GROUP 8. EXPLORATORY DATA ANALYSIS

81. UNIVARIATE EXPLORATORY DATA ANALYSIS
82. BIVARIATE EXPLORATORY DATA ANALYSIS

TO GET A COMPONENT, TYPE THE COMPONENT NUMBER (EXIT=0)?0

COMPONENT GROUPS

1. DATA MANAGEMENT FACILITY
2. SIMPLE BAYESIAN PARAMETRIC MODELS
3. DECISION THEORETIC MODELS
4. BAYESIAN SIMULTANEOUS ESTIMATION
5. BAYESIAN FULL-RANK ANALYSIS OF VARIANCE
6. BAYESIAN FULL-RANK MULTIVARIATE ANALYSIS
7. ELEMENTARY CLASSICAL STATISTICS
8. EXPLORATORY DATA ANALYSIS
9. PROBABILITY DISTRIBUTIONS

TO GET A COMPONENT GROUP, TYPE COMPONENT GROUP NUMBER (EXIT=0)?

Component Group 9

COMPONENT 91. EVALUATION OF PROBABILITY DISTRIBUTIONS

```
  1. NORMAL                        14. GAMMA
  2. STUDENT'S T                   15. BIVARIATE NORMAL
  3. INVERSE CHI                   16. MULTIVARIATE NORMAL
  4. INVERSE CHI-SQUARE            17. MULTIVARIATE T
  5. CHI-SQUARE                    18. DIRICHLET
  6. BETA
  7. BEHRENS FISHER
  8. SNEDECOR'S F
  9. BINOMIAL
 10. PASCAL
 11. BETA BINOMIAL
 12. BETA PASCAL
 13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?1
```

```
            EVALUATION OF A NORMAL DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A
NORMAL DISTRIBUTION.

INPUT THE MEAN OF THE NORMAL DISTRIBUTION.?0

INPUT THE STANDARD DEVIATION.?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES X IS ABOVE AND BELOW SOME VALUE
     4. PROBABILITY X IS BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?1
```

```
              OPTION 1: PERCENTILES

TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT PROBABILITY AS PERCENTAGE FROM .5 THROUGH 99.5
**************************************************************
                  NORMAL DISTRIBUTION
  MEAN=    0.00                STANDARD DEVIATION =    1.00
**************************************************************

INPUT % PROBABILITY?2.5
                          2.5 PERCENTILE =    -1.96

INPUT % PROBABILITY?95
                         95.0 PERCENTILE =     1.64

INPUT % PROBABILITY?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE ANOTHER NORMAL DISTRIBUTION
     3. END EVALUATION OF NORMAL DISTRIBUTIONS
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES X IS ABOVE AND BELOW SOME VALUE
     4. PROBABILITY X IS BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?2
```

```
            OPTION 2: HIGHEST DENSITY REGIONS

TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT P% AS NUMBER FROM 1 THROUGH 99.
****************************************************************
                    NORMAL DISTRIBUTION
  MEAN=    0.00                STANDARD DEVIATION =    1.00
****************************************************************

INPUT P%?95
                      95.0% HDR =     -1.96   TO     1.96
INPUT P%?90
                      90.0% HDR =     -1.64   TO     1.64
INPUT P%?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE ANOTHER NORMAL DISTRIBUTION
     3. END EVALUATION OF NORMAL DISTRIBUTIONS
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES X IS ABOVE AND BELOW SOME VALUE
     4. PROBABILITY X IS BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?3
```

```
     OPTION 3:  PROBABILITIES X IS ABOVE AND BELOW SOME VALUE.

TO EXIT ROUTINE TYPE '-7777' WHEN ASKED FOR INPUT.
*****************************************************************
                      NORMAL DISTRIBUTION
  MEAN=    0.00                  STANDARD DEVIATION =   1.00
*****************************************************************

INPUT VALUE?1.64
                         PROB ( X <     1.64 ) =0.95
                         PROB ( X >     1.64 ) =0.05

INPUT VALUE?1.96
                         PROB ( X <     1.96 ) =0.98
                         PROB ( X >     1.96 ) =0.02

INPUT VALUE?-7777









TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE ANOTHER NORMAL DISTRIBUTION
     3. END EVALUATION OF NORMAL DISTRIBUTIONS
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES X IS ABOVE AND BELOW SOME VALUE
     4. PROBABILITY X IS BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?4
```

```
    OPTION 4: PROBABILITY BETWEEN TWO VALUES

TO EXIT ROUTINE TYPE -7777 AS THE SMALLER VALUE
*****************************************************************
                  NORMAL DISTRIBUTION
  MEAN=    0.00                STANDARD DEVIATION =    1.00
*****************************************************************

INPUT SMALLER VALUE?-1.96
INPUT LARGER VALUE?1.96
                      PROB (    -1.96 < X <    1.96 ) = 0.95
INPUT SMALLER VALUE?-1
INPUT LARGER VALUE?1
                      PROB (    -1.00 < X <    1.00 ) = 0.68
INPUT SMALLER VALUE?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE ANOTHER NORMAL DISTRIBUTION
     3. END EVALUATION OF NORMAL DISTRIBUTIONS
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES X IS ABOVE AND BELOW SOME VALUE
     4. PROBABILITY X IS BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?5
```

```
OPTION 5:  GRAPH OF THE DENSITY FUNCTION OVER 99% HDR
*********************************************************************
                    NORMAL DISTRIBUTION
  MEAN=     0.00                STANDARD DEVIATION =    1.00
*********************************************************************
THESE ARE THE PARAMETERS OF THE DISTRIBUTION TO BE GRAPHED.
WHEN YOU ARE READY FOR THE GRAPH TO BE DISPLAYED TYPE '1'?1
```

```
NORMAL   MEAN=      0.00    ST.DEV.=       1.00
-2.58 I\\
-2.32 I\\\
-2.06 I\\\\\\
-1.80 I\\\\\\\\\I
-1.55 I\\\\\\\\\I\\\\\
-1.29 I\\\\\\\\\I\\\\\\\\\I\\
-1.03 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\
-0.77 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\
-0.52 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\
-0.26 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\
 0.00 I>>>>>>>>>1>>>>>>>>>2>>>>>>>>>3>>>>>>>>>4>>>>>>>>>5
 0.26 I/////////I/////////I/////////I/////////I////////
 0.52 I/////////I/////////I/////////I/////////I////
 0.77 I/////////I/////////I/////////I///////
 1.03 I/////////I/////////I/////////
 1.29 I/////////I/////////I//
 1.55 I/////////I/////
 1.80 I/////////I
 2.06 I//////
 2.32 I///
 2.58 I//                                    CONTINUE=1?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE ANOTHER NORMAL DISTRIBUTION
     3. END EVALUATION OF NORMAL DISTRIBUTIONS
?3
```

```
     COMPONENT 91.  EVALUATION OF PROBABILITY DISTRIBUTIONS

  1. NORMAL                        14. GAMMA
  2. STUDENT'S T                   15. BIVARIATE NORMAL
  3. INVERSE CHI                   16. MULTIVARIATE NORMAL
  4. INVERSE CHI-SQUARE            17. MULTIVARIATE T
  5. CHI-SQUARE                    18. DIRICHLET
  6. BETA
  7. BEHRENS FISHER
  8. SNEDECOR'S F
  9. BINOMIAL
 10. PASCAL
 11. BETA BINOMIAL
 12. BETA PASCAL
 13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?2
```

EVALUATION OF A STUDENT'S T DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A STUDENT'S T DISTRIBUTION.

ENTER THE DEGREES OF FREEDOM (MIN=3, MAX=100). ?3

INPUT MEAN.?0

IF YOU WANT TO INPUT THE SCALE PARAMETER TYPE 1.
IF YOU WANT TO INPUT THE STANDARD DEVIATION TYPE 2.
?1

INPUT SCALE PARAMETER.?3

TYPE THE NUMBER OF THE OPTION YOU WANT.

1. PERCENTILES
2. HIGHEST DENSITY REGIONS
3. PROBABILITIES T IS ABOVE AND BELOW SOME VALUE
4. PROBABILITY T IS BETWEEN TWO VALUES
5. PERCENTILES FOR TRUNCATED T DISTRIBUTION
6. GRAPH OF THE DENSITY FUNCTION
7. END EVALUATION OF T DISTRIBUTION

?1

```
      OPTION 1: PERCENTILES

TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT PROBABILITY AS PERCENTAGE FROM .5 THROUGH 99.5.
------------------------------------------------------------
              STUDENT'S T DISTRIBUTION
DEGREES OF FREEDOM =      3.00                MEAN =      0.00
SCALE PARAMETER    =      3.00   STANDARD DEVIATION =     1.73
------------------------------------------------------------
INPUT % PROBABILITY
?95
                          95.00 PERCENTILE =     2.36
INPUT % PROBABILITY
?97.5
                          97.50 PERCENTILE =     3.18
INPUT % PROBABILITY
?-7777




TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE A DIFFERENT STUDENT'S T DISTRIBUTION
     3. END EVALUATION OF T DISTRIBUTION
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
        1. PERCENTILES
        2. HIGHEST DENSITY REGIONS
        3. PROBABILITIES T IS ABOVE AND BELOW SOME VALUE
        4. PROBABILITY T IS BETWEEN TWO VALUES
        5. PERCENTILES FOR TRUNCATED T DISTRIBUTION
        6. GRAPH OF THE DENSITY FUNCTION
        7. END EVALUATION OF T DISTRIBUTION

?2
```

```
     OPTION 2: HIGHEST DENSITY REGIONS

TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT P% AS NUMBER FROM 5 THROUGH 99.
--------------------------------------------------------------
              STUDENT'S T DISTRIBUTION
DEGREES OF FREEDOM =      3.00                 MEAN =      0.00
SCALE PARAMETER    =      3.00   STANDARD DEVIATION =      1.73
--------------------------------------------------------------
INPUT P%?90
                        90.00% HDR =     -2.36    TO     2.36
INPUT P%?95
                        95.00% HDR =     -3.18    TO     3.18
INPUT P%?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE A DIFFERENT STUDENT'S T DISTRIBUTION
     3. END EVALUATION OF T DISTRIBUTION
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
        1. PERCENTILES
        2. HIGHEST DENSITY REGIONS
        3. PROBABILITIES T IS ABOVE AND BELOW SOME VALUE
        4. PROBABILITY T IS BETWEEN TWO VALUES
        5. PERCENTILES FOR TRUNCATED T DISTRIBUTION
        6. GRAPH OF THE DENSITY FUNCTION
        7. END EVALUATION OF T DISTRIBUTION

?3
```

```
        OPTION 3: PROBABILITIES T IS ABOVE AND BELOW SOME VALUE

TO EXIT ROUTINE TYPE '-7777' WHEN ASKED FOR INPUT.
------------------------------------------------------------
              STUDENT'S T DISTRIBUTION
DEGREES OF FREEDOM =       3.00                MEAN =      0.00
SCALE PARAMETER    =       3.00   STANDARD DEVIATION =      1.73
------------------------------------------------------------
INPUT VALUE?2.36
                         PROB( T <     2.36 ) = 0.95
                         PROB( T >     2.36 ) = 0.05
INPUT VALUE?1.73
                         PROB( T <     1.73 ) = 0.91
                         PROB( T >     1.73 ) = 0.09
INPUT VALUE?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE A DIFFERENT STUDENT'S T DISTRIBUTION
     3. END EVALUATION OF T DISTRIBUTION
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
        1. PERCENTILES
        2. HIGHEST DENSITY REGIONS
        3. PROBABILITIES T IS ABOVE AND BELOW SOME VALUE
        4. PROBABILITY T IS BETWEEN TWO VALUES
        5. PERCENTILES FOR TRUNCATED T DISTRIBUTION
        6. GRAPH OF THE DENSITY FUNCTION
        7. END EVALUATION OF T DISTRIBUTION

?4
```

```
    OPTION 4: PROBABILITY T IS BETWEEN TWO VALUES

TO EXIT ROUTINE TYPE -7777 AS THE SMALLER VALUE.
--------------------------------------------------------------
              STUDENT'S T DISTRIBUTION
DEGREES OF FREEDOM =     3.00                  MEAN =     0.00
SCALE PARAMETER    =     3.00   STANDARD DEVIATION =     1.73
--------------------------------------------------------------
INPUT SMALLER VALUE.?-2.36
INPUT LARGER VALUE.?2.36
        PROB(  -2.36  < T <    2.36) =0.90
INPUT SMALLER VALUE.?-3.18
INPUT LARGER VALUE.?3.18
        PROB(  -3.18  < T <    3.18) =0.95
INPUT SMALLER VALUE.?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE A DIFFERENT STUDENT'S T DISTRIBUTION
     3. END EVALUATION OF T DISTRIBUTION
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
        1. PERCENTILES
        2. HIGHEST DENSITY REGIONS
        3. PROBABILITIES T IS ABOVE AND BELOW SOME VALUE
        4. PROBABILITY T IS BETWEEN TWO VALUES
        5. PERCENTILES FOR TRUNCATED T DISTRIBUTION
        6. GRAPH OF THE DENSITY FUNCTION
        7. END EVALUATION OF T DISTRIBUTION

?5
```

```
IF THE DISTRIBUTION IS LEFT-TRUNCATED TYPE '1', ELSE '0'.?1

INPUT WHERE IT IS LEFT-TRUNCATED.?-2.36

IF IT IS RIGHT-TRUNCATED TYPE '1', ELSE '0'.?1

INPUT WHERE IT IS RIGHT-TRUNCATED.?2.36
```

```
    OPTION 5: PERCENTILES OF TRUNCATED DISTRIBUTION

TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT PROBABILITY AS PERCENTAGE FROM .5 THROUGH 99.5.
--------------------------------------------------------------
        TRUNCATED STUDENT'S T DISTRIBUTION
--------------------------------------------------------------
LEFT-TRUNCATED AT      -2.36     RIGHT-TRUNCATED AT       2.36

--------------------------------------------------------------
DEGREES OF FREEDOM =      3.00                 MEAN =     0.00
SCALE PARAMETER    =      3.00   STANDARD DEVIATION =     1.73
--------------------------------------------------------------
INPUT % PROBABILITY
?90
                     90.00 PERCENTILE (TRUNCATED) =    1.32
                     90.00 PERCENTILE (UNTRUN'ED) =    1.64
INPUT % PROBABILITY
?95
                     95.00 PERCENTILE (TRUNCATED) =    1.69
                     95.00 PERCENTILE (UNTRUN'ED) =    2.36
INPUT % PROBABILITY
?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE A DIFFERENT STUDENT'S T DISTRIBUTION
     3. END EVALUATION OF T DISTRIBUTION
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
          1. PERCENTILES
          2. HIGHEST DENSITY REGIONS
          3. PROBABILITIES T IS ABOVE AND BELOW SOME VALUE
          4. PROBABILITY T IS BETWEEN TWO VALUES
          5. PERCENTILES FOR TRUNCATED T DISTRIBUTION
          6. GRAPH OF THE DENSITY FUNCTION
          7. END EVALUATION OF T DISTRIBUTION

?6
```

```
OPTION 6:  GRAPH OF THE DENSITY FUNCTION  OVER 99% HDR
                STUDENT'S T DISTRIBUTION
DEGREES OF FREEDOM =       3.00                   MEAN =       0.00
SCALE PARAMETER    =       3.00   STANDARD DEVIATION =       1.73
-------------------------------------------------------------------
THESE ARE THE PARAMETERS OF THE DISTRIBUTION TO BE GRAPHED.
WHEN YOU ARE READY FOR THE GRAPH TO BE DISPLAYED TYPE '1'?1
```

```
 DF=      3.00   MEAN=        0.00   ST.DEV=      1.73
  -5.84 I
  -5.26 I
  -4.67 I\
  -4.09 I\
  -3.51 I\\
  -2.92 I\\\
  -2.34 I\\\\\\
  -1.75 I\\\\\\\\\I\\
  -1.17 I\\\\\\\\\I\\\\\\\\\I\\\\
  -0.58 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I
   0.00 I>>>>>>>>>1>>>>>>>>>2>>>>>>>>>3>>>>>>>>>4>>>>>>>>>5
   0.58 I/////////I/////////I/////////I/////////I
   1.17 I/////////I/////////I////
   1.75 I/////////I//
   2.34 I//////
   2.92 I///
   3.51 I//
   4.09 I/
   4.67 I/
   5.26 I
   5.84 I                                         CONTINUE=1?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE A DIFFERENT STUDENT'S T DISTRIBUTION
     3. END EVALUATION OF T DISTRIBUTION
?3
```

COMPONENT 91. EVALUATION OF PROBABILITY DISTRIBUTIONS

```
  1. NORMAL                      14. GAMMA
  2. STUDENT'S T                 15. BIVARIATE NORMAL
  3. INVERSE CHI                 16. MULTIVARIATE NORMAL
  4. INVERSE CHI-SQUARE          17. MULTIVARIATE T
  5. CHI-SQUARE                  18. DIRICHLET
  6. BETA
  7. BEHRENS FISHER
  8. SNEDECOR'S F
  9. BINOMIAL
 10. PASCAL
 11. BETA BINOMIAL
 12. BETA PASCAL
 13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?3
```

```
     EVALUATION OF INVERSE CHI DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF
AN INVERSE CHI DISTRIBUTION.

INPUT THE DEGREES OF FREEDOM (DF).(MIN=6 AND MAX=2000)?6

INPUT THE SCALE PARAMETER. STANDARD VALUE = 1.    ?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES ABOVE AND BELOW SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUNCTION
     6. END EVALUATION OF INVERSE CHI
?1
```

```
          OPTION 1: PERCENTILES

TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT PROBABILITY AS PERCENTAGE FROM .5 THROUGH 99.5.
-------------------------------------------------------------
                   INVERSE-CHI DISTRIBUTION
DEGREES OF FREEDOM =    6.00        SCALE PARAMETER =      1.000
              MEAN =    0.47             STAN. DEV. =      0.170
-------------------------------------------------------------
INPUT % PROBABILITY
?90
                              90.00 PERCENTILE =     0.67

INPUT % PROBABILITY
?95
                              95.00 PERCENTILE =     0.78

INPUT % PROBABILITY
?97.5
                              97.50 PERCENTILE =     0.90

INPUT % PROBABILITY
?-7777




TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER INVERSE CHI DISTRIBUTION
     3. END EVALUATION OF INVERSE CHI
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES ABOVE AND BELOW SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUNCTION
     6. END EVALUATION OF INVERSE CHI
?2
```

```
        OPTION 2: HIGHEST DENSITY REGIONS

TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT P% AS NUMBER FROM 1 THROUGH 99.
------------------------------------------------------------
                    INVERSE-CHI DISTRIBUTION
DEGREES OF FREEDOM =    6.00       SCALE PARAMETER =      1.000
              MEAN =    0.47            STAN. DEV. =      0.170
------------------------------------------------------------
INPUT P%?90
                              90.0% HDR =(     0.25,     0.69 )
INPUT P%?95
                              95.0% HDR =(     0.23,     0.80 )
INPUT P%?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER INVERSE CHI DISTRIBUTION
     3. END EVALUATION OF INVERSE CHI
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES ABOVE AND BELOW SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUNCTION
     6. END EVALUATION OF INVERSE CHI
?3
```

```
   OPTION 3: PROBABILITIES ABOVE AND BELOW SOME VALUE

TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
VALUE MUST BE POSITIVE.
---------------------------------------------------------------
                   INVERSE-CHI DISTRIBUTION
DEGREES OF FREEDOM =     6.00       SCALE PARAMETER =      1.000
              MEAN =     0.47            STAN. DEV. =      0.170
---------------------------------------------------------------
INPUT VALUE?.67
                              PROB( X >     0.670 ) =0.102
                              PROB( X <      0.670 ) =0.898
INPUT VALUE?.78
                              PROB( X >     0.780 ) =0.051
                              PROB( X <      0.780 ) =0.949
INPUT VALUE?-7777




TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER INVERSE CHI DISTRIBUTION
     3. END EVALUATION OF INVERSE CHI
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES ABOVE AND BELOW SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUNCTION
     6. END EVALUATION OF INVERSE CHI
?4
```

```
    OPTION 4: PROBABILITY X IS BETWEEN TWO VALUES

TO EXIT ROUTINE TYPE -7777 AS THE SMALLER VALUE.
------------------------------------------------------------
                   INVERSE-CHI DISTRIBUTION
DEGREES OF FREEDOM =     6.00      SCALE PARAMETER =      1.000
              MEAN =     0.47           STAN. DEV. =      0.170
------------------------------------------------------------
INPUT SMALLER VALUE?.25
INPUT LARGER VALUE?.69
                         PROB(      0.250 < X <      0.690 ) = 0.896
INPUT SMALLER VALUE?.23
INPUT LARGER VALUE?.80
                         PROB(      0.230 < X <      0.800 ) = 0.951
INPUT SMALLER VALUE?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER INVERSE CHI DISTRIBUTION
     3. END EVALUATION OF INVERSE CHI
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES ABOVE AND BELOW SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUNCTION
     6. END EVALUATION OF INVERSE CHI
?5
```

```
OPTION 5:  GRAPH OF THE DENSITY FUNCTION OVER 99% HDR
------------------------------------------------------------
                  INVERSE-CHI DISTRIBUTION
DEGREES OF FREEDOM =     6.00       SCALE PARAMETER =      1.000
              MEAN =     0.47            STAN. DEV. =      0.170
------------------------------------------------------------
THESE ARE THE PARAMETERS OF THE DISTRIBUTION TO BE GRAPHED.
WHEN YOU ARE READY FOR THE GRAPH TO BE DISPLAYED TYPE '1'.?1
```

```
DEGREES OF FREEDOM =      6.00    SCALE =     1.00
 0.20 I\
 0.25 I\\\\\\\\\I
 0.30 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I
 0.34 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\
 0.39 I>>>>>>>>>1>>>>>>>>>2>>>>>>>>>3>>>>>>>>>4>>>>>>>>>5
 0.43 I/////////I/////////I/////////I/////////I////
 0.48 I/////////I/////////I/////////I/////
 0.53 I/////////I/////////I///////
 0.57 I/////////I/////////I
 0.62 I/////////I////
 0.67 I/////////I
 0.71 I///////
 0.76 I/////
 0.80 I////
 0.85 I///
 0.90 I//
 0.94 I//
 0.99 I/
 1.04 I/
 1.08 I/                                        CONTINUE=1?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER INVERSE CHI DISTRIBUTION
     3. END EVALUATION OF INVERSE CHI
?3
```

```
     COMPONENT 91.  EVALUATION OF PROBABILITY DISTRIBUTIONS

   1. NORMAL                       14. GAMMA
   2. STUDENT'S T                  15. BIVARIATE NORMAL
   3. INVERSE CHI                  16. MULTIVARIATE NORMAL
   4. INVERSE CHI-SQUARE           17. MULTIVARIATE T
   5. CHI-SQUARE                   18. DIRICHLET
   6. BETA
   7. BEHRENS FISHER
   8. SNEDECOR'S F
   9. BINOMIAL
  10. PASCAL
  11. BETA BINOMIAL
  12. BETA PASCAL
  13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?4
```

```
     EVALUATION OF INVERSE CHI-SQUARE DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF
AN INVERSE CHI-SQUARE DISTRIBUTION.

INPUT THE DEGREES OF FREEDOM (DF).(MIN=6 AND MAX=2000)
?6

INPUT THE SCALE PARAMETER(MEAN MULTIPLIED BY (DF-2)).
STANDARD VALUE IS 1.?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES ABOVE AND BELOW SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUCNCTION
     6. EXIT MODULE
?1
```

```
                 OPTION 1: PERCENTILES

INPUT PROBABILITY AS PERCENTAGE FROM .5 THROUGH 99.5.
WHEN YOU WANT TO EXIT ROUTINE INPUT -7777 FOR % PROBABILITY
-----------------------------------------------------------
              INVERSE CHI-SQUARE DISTRIBUTION.
DEGREES OF FREEDOM =    6.00  SCALE PARAMETER =      1.000
              MEAN =    0.25       STAN. DEV. =      0.250
-----------------------------------------------------------
INPUT % PROBABILITY.?90
                              90.00 PERCENTILE =     0.45
INPUT % PROBABILITY.?95
                              95.00 PERCENTILE =     0.61
INPUT % PROBABILITY.?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER INVERSE CHI-SQUARE DISTRIBUTION
     3. EXIT MODULE
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES ABOVE AND BELOW SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUCNCTION
     6. EXIT MODULE
?2
```

```
            OPTION 2: P% HIGHEST DENSITY REGIONS

INPUT P% AS NUMBER FROM 5 THROUGH 99.
WHEN YOU WANT TO EXIT ROUTINE TYPE -7777 FOR P%.
--------------------------------------------------------------
              INVERSE CHI-SQUARE DISTRIBUTION.
DEGREES OF FREEDOM =     6.00  SCALE PARAMETER =       1.000
              MEAN =     0.25       STAN. DEV. =       0.250
--------------------------------------------------------------
INPUT P%?90
                              90.0% HDR =(     0.05,      0.46 )
INPUT P%?95
                              95.0% HDR =(     0.04,      0.62 )
INPUT P%?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER INVERSE CHI-SQUARE DISTRIBUTION
     3. EXIT MODULE
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES ABOVE AND BELOW SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUCNCTION
     6. EXIT MODULE
?3
```

```
      OPTION 3: PROBABILITIES ABOVE AND BELOW SOME VALUE

ONLY VALUES GREATER THAN 0 ARE ACCEPTABLE.
WHEN YOU WANT TO EXIT ROUTINE TYPE -7777 FOR VALUE.
-----------------------------------------------------------
              INVERSE CHI-SQUARE DISTRIBUTION.
DEGREES OF FREEDOM =    6.00  SCALE PARAMETER =      1.000
              MEAN =    0.25      STAN. DEV. =       0.250
-----------------------------------------------------------
INPUT VALUE?.45
                              PROB( X >      0.450 ) =0.10
                              PROB( X <      0.450 ) =0.90
INPUT VALUE?.61
                              PROB( X >      0.610 ) =0.05
                              PROB( X <      0.610 ) =0.95
INPUT VALUE?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER INVERSE CHI-SQUARE DISTRIBUTION
     3. EXIT MODULE
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES ABOVE AND BELOW SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUCNCTION
     6. EXIT MODULE
?4



          OPTION 4: PROBABILITY BETWEEN TWO VALUES

BOTH VALUES MUST BE GREATER THAN 0.
WHEN YOU WANT TO EXIT ROUTINE TYPE -7777 AS SMALLER VALUE
-----------------------------------------------------------
              INVERSE CHI-SQUARE DISTRIBUTION.
DEGREES OF FREEDOM =    6.00  SCALE PARAMETER =      1.000
              MEAN =    0.25       STAN. DEV. =      0.250
-----------------------------------------------------------
INPUT SMALLER VALUE?.05
INPUT LARGER VALUE?.46
                       PROB(     0.050   TO       0.460) =0.90
INPUT SMALLER VALUE?.04
INPUT LARGER VALUE?.62
                       PROB(     0.040   TO       0.620) =0.95
INPUT SMALLER VALUE?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER INVERSE CHI-SQUARE DISTRIBUTION
     3. EXIT MODULE
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES ABOVE AND BELOW SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUCNCTION
     6. EXIT MODULE
?5
```

```
OPTION 5: GRAPH OF THE DENSITY FUNCTION OVER 99% HDR
----------------------------------------------------------
              INVERSE CHI-SQUARE DISTRIBUTION.
DEGREES OF FREEDOM =     6.00  SCALE PARAMETER =      1.000
              MEAN =     0.25       STAN. DEV. =      0.250
----------------------------------------------------------
THESE ARE THE PARAMETERS OF THE DISTRIBUTION TO BE GRAPHED.
WHEN YOU ARE READY FOR THE GRAPH TO BE DISPLAYED TYPE '1'.?1
```

```
          GRAPH OF INVERSE CHI SQUARE 99.0 % HDR
     0.03 I
     0.09 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\
     0.15 I/////////I/////////I/////////I/////////I////////
     0.21 I/////////I/////////I/////////I/
     0.27 I/////////I/////////I
     0.33 I/////////I///
     0.39 I/////////
     0.45 I///////
     0.50 I////
     0.56 I///
     0.62 I//
     0.68 I/
     0.74 I/
     0.80 I/
     0.86 I/
     0.92 I/
     0.97 I
     1.03 I
     1.09 I
     1.15 I                                          CONTINUE=1?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER INVERSE CHI-SQUARE DISTRIBUTION
     3. EXIT MODULE
?3
```

COMPONENT 91. EVALUATION OF PROBABILITY DISTRIBUTIONS

```
 1. NORMAL                      14. GAMMA
 2. STUDENT'S T                 15. BIVARIATE NORMAL
 3. INVERSE CHI                 16. MULTIVARIATE NORMAL
 4. INVERSE CHI-SQUARE          17. MULTIVARIATE T
 5. CHI-SQUARE                  18. DIRICHLET
 6. BETA
 7. BEHRENS FISHER
 8. SNEDECOR'S F
 9. BINOMIAL
10. PASCAL
11. BETA BINOMIAL
12. BETA PASCAL
13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?5
```

EVALUATION OF A CHI-SQUARE DISTRIBUTION

```
THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF
A CHI-SQUARE DISTRIBUTION.

INPUT DEGREES OF FREEDOM. (MIN=4 AND MAX=2000).?4

INPUT SCALE PARAMETER(MEAN DIVIDED BY DF).?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?1
```

```
                OPTION 1: PERCENTILES

INPUT PERCENTILE AS NUMBER FROM .5 THRU 99.5.
WHEN YOU WANT TO EXIT ROUTINE TYPE '0' FOR PERCENTILE.
-------------------------------------------------------------
                CHI-SQUARE DISTRIBUTION
DEGREES OF FREEDOM =    4.00      SCALE PARAMETER =     1.000
              MEAN =    4.00           STAN. DEV. =     2.828
-------------------------------------------------------------
INPUT PERCENTILE?90
                            90.00 PERCENTILE =          7.77
INPUT PERCENTILE?95
                            95.00 PERCENTILE =          9.48
INPUT PERCENTILE?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER CHI-SQUARE DISTRIBUTION.
     3. EXIT MODULE
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?2
```

```
            OPTION 2: P% HIGHEST DENSITY REGIONS

INPUT P% AS NUMBER FROM 5 TO 99.
WHEN YOU WANT TO EXIT ROUTINE TYPE '0' FOR P%.
----------------------------------------------------------------
                 CHI-SQUARE DISTRIBUTION
DEGREES OF FREEDOM =    4.00      SCALE PARAMETER =      1.000
              MEAN =    4.00          STAN. DEV. =      2.828
----------------------------------------------------------------
INPUT P%?90
                              90.0% HDR =(     0.17,     7.86 )
INPUT P%?95
                              95.0% HDR =(     0.09,     9.52 )
INPUT P%?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER CHI-SQUARE DISTRIBUTION.
     3. EXIT MODULE
?1


TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?3
```

OPTION 3: PROBABILITY LESS THAN SOME VALUE

```
INPUTTED VALUE MUST BE POSITIVE.
WHEN YOU WANT TO EXIT ROUTINE TYPE '0' FOR VALUE.
-----------------------------------------------------------------
                 CHI-SQUARE DISTRIBUTION
DEGREES OF FREEDOM =    4.00      SCALE PARAMETER =      1.000
              MEAN =    4.00           STAN. DEV. =      2.828
-----------------------------------------------------------------
INPUT VALUE?7.77
                             PROB( X <      7.77 ) =0.90
                             PROB( X >      7.77 ) =0.10
INPUT VALUE?9.48
                             PROB( X <      9.48 ) =0.95
                             PROB( X >      9.48 ) =0.05
INPUT VALUE?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER CHI-SQUARE DISTRIBUTION.
     3. EXIT MODULE
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?4
```

```
        OPTION 4: PROBABILITY BETWEEN TWO VALUES

BOTH VALUES MUST BE GREATER THAN 0.
WHEN YOU WANT TO EXIT ROUTINE TYPE '0' FOR BOTH VALUES.
--------------------------------------------------------------
                CHI-SQUARE DISTRIBUTION
DEGREES OF FREEDOM =    4.00      SCALE PARAMETER =      1.000
              MEAN =    4.00           STAN. DEV. =      2.828
--------------------------------------------------------------
INPUT SMALLER VALUE?.17
INPUT LARGER VALUE?7.86
                         PROB(    0.17  TO     7.86 ) = 0.90
INPUT SMALLER VALUE?.09
INPUT LARGER VALUE?9.52
                         PROB(    0.09  TO     9.52 ) = 0.95
INPUT SMALLER VALUE?0
INPUT LARGER VALUE?0




TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER CHI-SQUARE DISTRIBUTION.
     3. EXIT MODULE
?1


TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?5
```

```
OPTION 5:  GRAPH OF THE DENSITY FUNCTION OVER 99% HDR
----------------------------------------------------------------
                 CHI-SQUARE DISTRIBUTION
DEGREES OF FREEDOM =     4.00      SCALE PARAMETER =       1.000
              MEAN =     4.00           STAN. DEV. =       2.828
----------------------------------------------------------------
THESE ARE THE PARAMETERS OF THE DISTRIBUTION TO GRAPHED.
WHEN YOU ARE READY FOR THE GRAPH TO BE DISPLAYED TYPE '1'.?1
```

```
  DF=      4.00      SCALE PARAMETER=       1.00
 0.02 I\
 0.72 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\
 1.41 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\
 2.11 I>>>>>>>>>1>>>>>>>>>2>>>>>>>>>3>>>>>>>>>4>>>>>>>>>5
 2.81 I/////////I/////////I/////////I/////////I///////
 3.51 I/////////I/////////I/////////I/////////I/
 4.20 I/////////I/////////I/////////I/////
 4.90 I/////////I/////////I/////////
 5.60 I/////////I/////////I///
 6.30 I/////////I////////
 6.99 I/////////I////
 7.69 I/////////I/
 8.39 I/////////
 9.09 I///////
 9.78 I/////
10.48 I////
11.18 I///
11.88 I//
12.57 I//
13.27 I/                                         CONTINUE=1?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER CHI-SQUARE DISTRIBUTION.
     3. EXIT MODULE
?3
```

```
     COMPONENT 91.  EVALUATION OF PROBABILITY DISTRIBUTIONS

   1. NORMAL                           14. GAMMA
   2. STUDENT'S T                      15. BIVARIATE NORMAL
   3. INVERSE CHI                      16. MULTIVARIATE NORMAL
   4. INVERSE CHI-SQUARE               17. MULTIVARIATE T
   5. CHI-SQUARE                       18. DIRICHLET
   6. BETA
   7. BEHRENS FISHER
   8. SNEDECOR'S F
   9. BINOMIAL
  10. PASCAL
  11. BETA BINOMIAL
  12. BETA PASCAL
  13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?6
```

```
          EVALUATION OF A BETA DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A
BETA DISTRIBUTION.

INPUT FIRST PARAMETER (A) OF THE BETA DISTRIBUTION.?2

INPUT SECOND (B) PARAMETER.?3

TYPE THE NUMBER OF THE OPTION YOU WANT.
    1. PERCENTILES
    2. HIGHEST DENSITY REGIONS
    3. PROBABILITY PI IS LESS THAN SOME VALUE
    4. PROBABILITY PI IS BETWEEN TWO VALUES
    5. GRAPH OF THE DENSITY FUNCTION
    6. END EVALUATION OF BETA DISTRIBUTION
?1
```

```
          OPTION 1: PERCENTILES

TO EXIT ROUTINE TYPE '0' WHEN ASKED FOR INPUT.
INPUT PERCENTILES AS NUMBERS FROM .5 THROUGH 99.5.
-------------------------------------------------------------
BETA           A=    2.00        B=    3.00
           MEAN=0.40    ST. DEV.=0.2000
-------------------------------------------------------------

INPUT PERCENTILE?5
                                     5.0% = 0.10
INPUT PERCENTILE?95
                                    95.0% = 0.75
INPUT PERCENTILE?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. FURTHER EVALUATE THIS DISTRIBUTION
      2. EVALUATE ANOTHER BETA DISTRIBUTION
      3. END EVALUATION OF BETA DISTRIBUTION
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
    1. PERCENTILES
    2. HIGHEST DENSITY REGIONS
    3. PROBABILITY PI IS LESS THAN SOME VALUE
    4. PROBABILITY PI IS BETWEEN TWO VALUES
    5. GRAPH OF THE DENSITY FUNCTION
    6. END EVALUATION OF BETA DISTRIBUTION
?2
```

```
     OPTION 2: HIGHEST DENSITY REGIONS

TO EXIT ROUTINE TYPE '0' WHEN ASKED FOR INPUT.
INPUT P% AS NUMBER FROM 5 THROUGH 99.
-------------------------------------------------------------
BETA          A=   2.00        B=   3.00
           MEAN=0.40   ST. DEV.=0.2000
-------------------------------------------------------------

INPUT P%?90
                       90.0% HDR = ( .07    -  0.71 )
INPUT P%?95
                       95.0% HDR = ( .04    -  0.77 )
INPUT P%?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. FURTHER EVALUATE THIS DISTRIBUTION
      2. EVALUATE ANOTHER BETA DISTRIBUTION
      3. END EVALUATION OF BETA DISTRIBUTION
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
    1. PERCENTILES
    2. HIGHEST DENSITY REGIONS
    3. PROBABILITY PI IS LESS THAN SOME VALUE
    4. PROBABILITY PI IS BETWEEN TWO VALUES
    5. GRAPH OF THE DENSITY FUNCTION
    6. END EVALUATION OF BETA DISTRIBUTION
?3
```

```
   OPTION 3: PROBABILITY PI IS LESS THAN X

TO EXIT ROUTINE TYPE '0' WHEN ASKED FOR VALUE OF X.
INPUT X AS A NUMBER BETWEEN 0 AND 1.
------------------------------------------------------------
BETA           A=   2.00         B=   3.00
           MEAN=0.40   ST. DEV.=0.2000
------------------------------------------------------------

INPUT X?.10
                         PROB( P1 < 0.100 ) = 0.05
                         PROB( PI > 0.100 ) = 0.95

INPUT X?.75
                         PROB( P1 < 0.750 ) = 0.95
                         PROB( PI > 0.750 ) = 0.05

INPUT X?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. FURTHER EVALUATE THIS DISTRIBUTION
      2. EVALUATE ANOTHER BETA DISTRIBUTION
      3. END EVALUATION OF BETA DISTRIBUTION
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
    1. PERCENTILES
    2. HIGHEST DENSITY REGIONS
    3. PROBABILITY PI IS LESS THAN SOME VALUE
    4. PROBABILITY PI IS BETWEEN TWO VALUES
    5. GRAPH OF THE DENSITY FUNCTION
    6. END EVALUATION OF BETA DISTRIBUTION
?4
```

```
     OPTION 4:  PROBABILITY PI IS BETWEEN TWO VALUES

TO EXIT ROUTINE TYPE '0''S WHEN ASKED FOR INPUT.
------------------------------------------------------------
BETA          A=   2.00        B=   3.00
          MEAN=0.40   ST. DEV.=0.2000
------------------------------------------------------------

INPUT SMALLER VALUE?.07
INPUT LARGER VALUE?.71
                              PROB( .070 < PI < 0.710 ) =0.90
INPUT SMALLER VALUE?.04
INPUT LARGER VALUE?.77
                              PROB( .040 < PI < 0.770 ) =0.95
INPUT SMALLER VALUE?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. FURTHER EVALUATE THIS DISTRIBUTION
      2. EVALUATE ANOTHER BETA DISTRIBUTION
      3. END EVALUATION OF BETA DISTRIBUTION
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
    1. PERCENTILES
    2. HIGHEST DENSITY REGIONS
    3. PROBABILITY PI IS LESS THAN SOME VALUE
    4. PROBABILITY PI IS BETWEEN TWO VALUES
    5. GRAPH OF THE DENSITY FUNCTION
    6. END EVALUATION OF BETA DISTRIBUTION
?5
```

```
OPTION 5:  GRAPH OF THE DENSITY FUNCTION OVER 99% HDR
---------------------------------------------------------------
BETA          A=   2.00       B=   3.00
           MEAN=0.40   ST. DEV.=0.2000
---------------------------------------------------------------
THESE ARE THE PARAMATERS OF THE DISTRIBUTION TO BE GRAPHED.
WHEN YOU ARE READY FOR THE GRAPH TO BE DISPLAYED TYPE '1'.?1
```

```
GRAPH OF BETA (   2.00      3.00) 99.0% HDR
0.02 I\\\\\
0.06 I\\\\\\\\\I\\\\\\\\
0.11 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\
0.15 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\
0.20 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\
0.24 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\
0.28 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\
0.33 I>>>>>>>>>1>>>>>>>>>2>>>>>>>>>3>>>>>>>>>4>>>>>>>>>5
0.37 I/////////I/////////I/////////I/////////I/////////
0.42 I/////////I/////////I/////////I/////////I////////
0.46 I/////////I/////////I/////////I/////////I/////
0.51 I/////////I/////////I/////////I/////////I/
0.55 I/////////I/////////I/////////I///////
0.60 I/////////I/////////I/////////I///
0.64 I/////////I/////////I////////
0.69 I/////////I/////////I///
0.73 I/////////I////////
0.78 I/////////I///
0.82 I/////////
0.87 I/////                                 CONTINUE=1?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. FURTHER EVALUATE THIS DISTRIBUTION
      2. EVALUATE ANOTHER BETA DISTRIBUTION
      3. END EVALUATION OF BETA DISTRIBUTION
?3
```

COMPONENT 91. EVALUATION OF PROBABILITY DISTRIBUTIONS

```
  1. NORMAL                        14. GAMMA
  2. STUDENT'S T                   15. BIVARIATE NORMAL
  3. INVERSE CHI                   16. MULTIVARIATE NORMAL
  4. INVERSE CHI-SQUARE            17. MULTIVARIATE T
  5. CHI-SQUARE                    18. DIRICHLET
  6. BETA
  7. BEHRENS FISHER
  8. SNEDECOR'S F
  9. BINOMIAL
 10. PASCAL
 11. BETA BINOMIAL
 12. BETA PASCAL
 13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?7
```

EVALUATION OF BEHRENS-FISHER DISTRIBUTION

```
 THE BEHRENS-FISHER DISTRIBUTION IS DEFINED AS THE DISTRIBUTION
OF THE QUANTITY  T1 - T2  WHERE T1 AND T2 HAVE T-DISTRIBUTIONS
WITH PARAMETERS (NU1,M1,K1) AND (NU2,M2,K2) RESPECTIVELY.

 THERE ARE TWO WAYS TO SPECIFY THE BEHRENS-FISHER DISTRIBUTION:

(1) TO INPUT (NU1,M1,K1) AND (NU2,M2,K2) , WHERE
   NU1  AND  NU2  ARE THE DEGREES OF FREEDOM (D.F.) ,
   M1   AND  M2   ARE THE MEANS ,AND
   K1   AND  K2   ARE THE SCALE PARAMETERS OF EACH T-DISTRIBUTION.
      SCALE PARAMETER := VARIANCE  X  ( D.F. - 2)

(2) TO INPUT (PSY,NU1,NU2,EPSILON,ZETA) , WHERE
   PSY := ARCTANGENT OF SQUARE ROOT OF ( (NU2 X K1)/(NU1 X K2) )
           --- IN DEGREES ---
   EPSILON := SQUARE ROOT OF ( (K1/NU1) + (K2/NU2) )
   ZETA := M1 - M2

WHICH WAY DO YOU PREFER, (1) OR (2) ?1
```

```
INPUT NU1 (DEGREES OF FREEDOM OF THE 1ST T-DISTRIBUTION)?6
INPUT M1  (MEAN OF THE 1ST T-DISTRIBUTION)?0
INPUT K1  (SCALE PARAMETER OF THE 1ST T-DISTRIBUTION)?6

INPUT NU2 (DEGREES OF FREEDOM OF THE 2ND T-DISTRIBUTION)?10
INPUT M2  (MEAN OF THE 2ND T-DISTRIBUTION)?0
INPUT K2  (SCALE PARAMETER OF THE 2ND T-DISTRIBUTION)?10
```

```
TYPE THE NUMBER OF OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUNCTION
     6. EXIT
?1
```

```
            OPTION 1: PERCENTILES

TO EXIT ROUTINE TYPE '0' WHEN ASKED FOR INPUT.
INPUT PERCENTILE AS NUMBER FROM 2.5 THROUGH 97.5.
-----------------------------------------------------
                BEHRENS-FISHER DISTRIBUTION
-----------------------------------------------------
NU1=   6.00      NU2=  10.00      PSI=45.00 DEGREES
EPSILON (SCALE) =    1.414        ZETA (MEAN) =  0.00
STANDARD DEVIATION=    1.692        ( M1 - M2 )
-----------------------------------------------------
-----------------------------------------------------
INPUT PERCENTILE?5
                          5.00 PERCENTILE =       -2.68
INPUT PERCENTILE?97.5
                         97.50 PERCENTILE =        3.31
INPUT PERCENTILE?0




TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE A DIFFERENT BEHRENS-FISHER DISTRIBUTION
     3. EXIT MODULE
?2
```

```
     EVALUATION OF BEHRENS-FISHER DISTRIBUTION

 THE BEHRENS-FISHER DISTRIBUTION IS DEFINED AS THE DISTRIBUTION
OF THE QUANTITY  T1 - T2  WHERE T1 AND T2 HAVE T-DISTRIBUTIONS
WITH PARAMETERS (NU1,M1,K1) AND (NU2,M2,K2) RESPECTIVELY.

 THERE ARE TWO WAYS TO SPECIFY THE BEHRENS-FISHER DISTRIBUTION:

(1) TO INPUT (NU1,M1,K1) AND (NU2,M2,K2) , WHERE
   NU1  AND  NU2  ARE THE DEGREES OF FREEDOM (D.F.) ,
   M1   AND  M2   ARE THE MEANS ,AND
   K1   AND  K2   ARE THE SCALE PARAMETERS OF EACH T-DISTRIBUTION.
      SCALE PARAMETER := VARIANCE  X  ( D.F. - 2)

(2) TO INPUT (PSY,NU1,NU2,EPSILON,ZETA) , WHERE
   PSY := ARCTANGENT OF SQUARE ROOT OF ( (NU2 X K1)/(NU1 X K2) )
          --- IN DEGREES ---
   EPSILON := SQUARE ROOT OF ( (K1/NU1) + (K2/NU2) )
   ZETA := M1 - M2


WHICH WAY DO YOU PREFER, (1) OR (2) ?2




INPUT THE PARAMETERS OF THE BEHRENS-FISHER DISTRIBUTION.

LET THE PARAMETERS OF THE TWO T DISTRIBUTIONS BE DENOTED BY
   NU1  AND  NU2    DEGREES OF FREEDOM
   M1   AND  M2     MEANS
   K1   AND  K2     SCALE PARAMETERS

PSI=ARCTANGENT OF SQUARE ROOT (NU2 TIMES K1 DIVIDED BY
    NU1 TIMES K2) --IN DEGREES--?45

NU1=DEGREES OF FREEDOM OF 1ST T-DISTRIBUTION?6

NU2=DEGREES OF FREEDOM OF THE 2ND DISTRIBUTION?10

EPSILON=SQUARE ROOT OF K1 DIVIDED BY NU1 PLUS K2 DIVIDED BY NU2?1.414

ZETA=MEAN OF 1ST MINUS MEAN OF 2ND?0
```

```
     EVALUATION OF BEHRENS-FISHER DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A
BEHRENS-FISHER DISTRIBUTION.
TYPE THE NUMBER OF OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUNCTION
     6. EXIT
?2
```

```
           OPTION 2: HIGHEST DENSITY REGIONS

TO EXIT ROUTINE TYPE '0' WHEN ASKED FOR INPUT.
YOU CAN GET ANY P% HDR FROM 20 TO 98.
-----------------------------------------------------
               BEHRENS-FISHER DISTRIBUTION
-----------------------------------------------------
NU1=   6.00     NU2=  10.00     PSI=45.00 DEGREES
EPSILON (SCALE) =    1.414      ZETA (MEAN) =  0.00
STANDARD DEVIATION=   1.691       ( M1 - M2 )
-----------------------------------------------------
-----------------------------------------------------
INPUT P%?90
                      90.0% HDR = (    -2.68,      2.68 )
INPUT P%?95
                      95.0% HDR = (    -3.31,      3.31 )
INPUT P%?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE A DIFFERENT BEHRENS-FISHER DISTRIBUTION
     3. EXIT MODULE
?1
```

```
TYPE THE NUMBER OF OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUNCTION
     6. EXIT
?3
```

```
        OPTION 3: PROBABILITY LESS THAN SOME VALUE
TO EXIT ROUTINE TYPE '-7777' WHEN ASKED FOR INPUT.
-------------------------------------------------------
                BEHRENS-FISHER DISTRIBUTION
-------------------------------------------------------
NU1=   6.00      NU2=  10.00      PSI=45.00 DEGREES
EPSILON (SCALE) =    1.414        ZETA (MEAN) =  0.00
STANDARD DEVIATION=    1.691         ( M1 - M2 )
-------------------------------------------------------
-------------------------------------------------------
INPUT X?2.68
                     PROB ( BF <      2.68 ) =0.95
                     PROB ( BF >      2.68 ) =0.05
INPUT X?1.691
                     PROB ( BF <      1.69 ) =0.86
                     PROB ( BF >      1.69 ) =0.14
INPUT X?-7777




TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE A DIFFERENT BEHRENS-FISHER DISTRIBUTION
     3. EXIT MODULE
?1
```

```
TYPE THE NUMBER OF OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUNCTION
     6. EXIT
?4
```

```
        OPTION 4: PROBABILITY BETWEEN TWO VALUES

TO EXIT ROUTINE TYPE '-7777'S WHEN ASKED FOR INPUT.
------------------------------------------------------
                BEHRENS-FISHER DISTRIBUTION
------------------------------------------------------
NU1=   6.00     NU2=  10.00     PSI=45.00 DEGREES
EPSILON (SCALE) =    1.414      ZETA (MEAN) =  0.00
STANDARD DEVIATION=    1.691       ( M1 - M2 )
------------------------------------------------------
------------------------------------------------------
INPUT SMALLER VALUE?-2.68
INPUT LARGER VALUE?2.68
                      PROB (   -2.68 < X <     2.68 ) =0.90
INPUT SMALLER VALUE?0
INPUT LARGER VALUE?1.691
                      PROB (    0.00 < X <     1.69 ) =0.36
INPUT SMALLER VALUE?-7777
INPUT LARGER VALUE?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE A DIFFERENT BEHRENS-FISHER DISTRIBUTION
     3. EXIT MODULE
?1
```

```
TYPE THE NUMBER OF OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF THE DENSITY FUNCTION
     6. EXIT
?5
```

```
   OPTION 5: GRAPH OF DENSITY FUNCTION OVER 99% HDR
                BEHRENS-FISHER DISTRIBUTION
-------------------------------------------------------
NU1=   6.00     NU2=  10.00     PSI=45.00 DEGREES
EPSILON (SCALE) =    1.414      ZETA (MEAN) =  0.00
STANDARD DEVIATION=    1.691       ( M1 - M2 )
-------------------------------------------------------
THESE ARE THE PARAMETERS OF THE DISTRIBUTION TO BE GRAPHED.
WHEN YOU ARE READY FOR THE GRAPH TO BE DISPLAYED TYPE '1'.?1
```

```
          GRAPH OF BEHRENS-FISHER 99.0 % HDR
   -4.73 I\
   -4.25 I\\
   -3.78 I\\\
   -3.31 I\\\\\
   -2.84 I\\\\\\\\\
   -2.36 I\\\\\\\\\I\\\\
   -1.89 I\\\\\\\\\I\\\\\\\\\I\\
   -1.42 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\
   -0.95 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I
   -0.47 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\
0.00E+00 I>>>>>>>>>1>>>>>>>>>2>>>>>>>>>3>>>>>>>>>4>>>>>>>>>5
    0.47 I/////////I/////////I/////////I/////////I///////
    0.95 I/////////I/////////I/////////I/////////I
    1.42 I/////////I/////////I/////////I/
    1.89 I/////////I/////////I//
    2.36 I/////////I////
    2.84 I/////////
    3.31 I/////
    3.78 I///
    4.25 I//
    4.73 I/                                 CONTINUE=1?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. EVALUATE A DIFFERENT BEHRENS-FISHER DISTRIBUTION
     3. EXIT MODULE
?3
```

```
     COMPONENT 91.  EVALUATION OF PROBABILITY DISTRIBUTIONS

   1. NORMAL                         14. GAMMA
   2. STUDENT'S T                    15. BIVARIATE NORMAL
   3. INVERSE CHI                    16. MULTIVARIATE NORMAL
   4. INVERSE CHI-SQUARE             17. MULTIVARIATE T
   5. CHI-SQUARE                     18. DIRICHLET
   6. BETA
   7. BEHRENS FISHER
   8. SNEDECOR'S F
   9. BINOMIAL
  10. PASCAL
  11. BETA BINOMIAL
  12. BETA PASCAL
  13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?8
```

EVALUATION OF A SNEDECOR F-DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A F-DISTRIBUTION. THE F DISTRIBUTION IS DEFINED AS THE RATIO OF TWO INVERSE CHI SQUARE DISTRIBUTIONS (PHI2/PHI1). THE PARAMETERS ARE DEGREES OF FREEDOM NU AND SCALE PARAMETERS LAMBDA FOR PHI1 AND PHI2 RESP. TO STUDY THE STANDARD DISTRIBUTION F(NU1,NU2) ENTER LAMBDA1 = NU1 AND LAMBDA2 = NU2.

ENTER THE FIRST DEGREES OF FREEDOM (MIN=3, MAX=2000). ?3

ENTER THE SECOND DEGREES OF FREEDOM (MIN=3, MAX=2000). ?3

INPUT THE FIRST SCALE PARAMETER.?1

INPUT THE SECOND SCALE PARAMETER.?1

TYPE THE NUMBER OF THE OPTION YOU WANT.

1. PERCENTILES
2. HIGHEST DENSITY REGIONS
3. PROBABILITY F IS LESS THAN SOME VALUE.
4. PROBABILITY IN INTERVAL
5. GRAPH OF THE DENSITY FUNCTION
6. EXIT MODULE

?1

```
        OPTION 1: PERCENTILES

TO EXIT ROUTINE TYPE '0' WHEN ASKED FOR INPUT.
INPUT PERCENTILES AS NUMBERS FROM .5 THROUGH 99.5.
--------------------------------------------------------------
                 F-DISTRIBUTION
NU1 =    3.00                        LAMBDA1 =      1.00
NU2 =    3.00                        LAMBDA2 =      1.00
MEAN=    3.00                        MODE=          0.20
--------------------------------------------------------------
INPUT PERCENTILE?90
                               90.0% =      5.39
INPUT PERCENTILE?95
                               95.0% =      9.27
INPUT PERCENTILE?0




TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. FURTHER EVALUATE THIS DISTRIBUTION
      2. EVALUATE ANOTHER F-DISTRIBUTION
      3. EXIT MODULE
      ?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
    1. PERCENTILES
    2. HIGHEST DENSITY REGIONS
    3. PROBABILITY F IS LESS THAN SOME VALUE.
    4. PROBABILITY IN INTERVAL
    5. GRAPH OF THE DENSITY FUNCTION
    6. EXIT MODULE
?2
```

```
     OPTION 2: HIGHEST DENSITY REGIONS

TO EXIT ROUTINE TYPE '0' WHEN ASKED FOR INPUT.
INPUT P% AS NUMBER FROM 5 THROUGH 99.
----------------------------------------------------------------
                F-DISTRIBUTION
NU1 =    3.00                          LAMBDA1 =      1.00
NU2 =    3.00                          LAMBDA2 =      1.00
MEAN=    3.00                          MODE=          0.20
----------------------------------------------------------------
INPUT P%?90
                      90.0% HDR = (      0.00    -       5.39 )
INPUT P%?95
                      95.0% HDR = (      0.00    -       9.28 )
INPUT P%?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. FURTHER EVALUATE THIS DISTRIBUTION
      2. EVALUATE ANOTHER F-DISTRIBUTION
      3. EXIT MODULE
      ?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
    1. PERCENTILES
    2. HIGHEST DENSITY REGIONS
    3. PROBABILITY F IS LESS THAN SOME VALUE.
    4. PROBABILITY IN INTERVAL
    5. GRAPH OF THE DENSITY FUNCTION
    6. EXIT MODULE
?3
```

```
    OPTION 3: PROBABILITY F IS LESS THAN X.

TO EXIT ROUTINE TYPE '0' WHEN ASKED FOR VALUE OF X.
INPUT X AS A POSITIVE NUMBER.
--------------------------------------------------------------
                     F-DISTRIBUTION
NU1 =    3.00                           LAMBDA1 =      1.00
NU2 =    3.00                           LAMBDA2 =      1.00
MEAN=    3.00                           MODE=          0.20
--------------------------------------------------------------
INPUT X?5.39
                          PROB( F <     5.39 ) =0.90
                          PROB( F >     5.39 ) =0.10
INPUT X?9.27
                          PROB( F <     9.27 ) =0.95
                          PROB( F >     9.27 ) =0.05
INPUT X?0




TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. FURTHER EVALUATE THIS DISTRIBUTION
      2. EVALUATE ANOTHER F-DISTRIBUTION
      3. EXIT MODULE
      ?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
    1. PERCENTILES
    2. HIGHEST DENSITY REGIONS
    3. PROBABILITY F IS LESS THAN SOME VALUE.
    4. PROBABILITY IN INTERVAL
    5. GRAPH OF THE DENSITY FUNCTION
    6. EXIT MODULE
?4
```

```
      OPTION 4: PROBABILITY F IS BETWEEN TWO VALUES.

TO EXIT ROUTINE TYPE '0''S WHEN ASKED FOR INPUT.
-------------------------------------------------------------
                 F-DISTRIBUTION
NU1 =   3.00                        LAMBDA1 =     1.00
NU2 =   3.00                        LAMBDA2 =     1.00
MEAN=   3.00                        MODE=         0.20
-------------------------------------------------------------
INPUT SMALLER VALUE?5.39
INPUT LARGER VALUE?9.27
                               PROB(   5.39  < F <   9.27 ) =0.05
INPUT SMALLER VALUE?0
INPUT LARGER VALUE?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. FURTHER EVALUATE THIS DISTRIBUTION
      2. EVALUATE ANOTHER F-DISTRIBUTION
      3. EXIT MODULE
      ?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
    1. PERCENTILES
    2. HIGHEST DENSITY REGIONS
    3. PROBABILITY F IS LESS THAN SOME VALUE.
    4. PROBABILITY IN INTERVAL
    5. GRAPH OF THE DENSITY FUNCTION
    6. EXIT MODULE
?5
```

OPTION 5: GRAPH OF THE DENSITY FUNCTION OVER 97.5% HDR

F-DISTRIBUTION

```
NU1 =    3.00                         LAMBDA1 =      1.00
NU2 =    3.00                         LAMBDA2 =      1.00
MEAN=    3.00                         MODE=          0.20
```

THESE ARE THE PARAMETERS OF THE F DISTRIBUTION TO BE GRAPHED.
WHEN YOU ARE READY FOR THE GRAPH TO BE DISPLAYED, TYPE '1'.?1

```
 0.00  I
 0.81  I//////////I//////////I//////////
 1.62  I//////////I////
 2.44  I///////
 3.25  I/////
 4.06  I///
 4.87  I//
 5.69  I//
 6.50  I/
 7.31  I/
 8.12  I/
 8.94  I/
 9.75  I
10.56  I
11.37  I
12.19  I
13.00  I
13.81  I
14.62  I
15.44  I                                              CONTINUE=1?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. FURTHER EVALUATE THIS DISTRIBUTION
      2. EVALUATE ANOTHER F-DISTRIBUTION
      3. EXIT MODULE
      ?3
```

```
     COMPONENT 91.  EVALUATION OF PROBABILITY DISTRIBUTIONS

   1. NORMAL                          14. GAMMA
   2. STUDENT'S T                     15. BIVARIATE NORMAL
   3. INVERSE CHI                     16. MULTIVARIATE NORMAL
   4. INVERSE CHI-SQUARE              17. MULTIVARIATE T
   5. CHI-SQUARE                      18. DIRICHLET
   6. BETA
   7. BEHRENS FISHER
   8. SNEDECOR'S F
   9. BINOMIAL
  10. PASCAL
  11. BETA BINOMIAL
  12. BETA PASCAL
  13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?9
```

EVALUATION OF BINOMIAL DISTRIBUTION

```
THIS MODULE WILL HELP YOU EXAMINE THE CHARACTERISTICS OF A
BINOMIAL DISTRIBUTION.

INPUT THE PARAMETERS OF THE BINOMIAL DISTRIBUTION YOU WANT TO
EXAMINE.

INPUT THE PROCESS PARAMETER P.?.6

INPUT THE SIZE PARAMETER N.?20

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PROBABILITIES THAT THE NUMBER OF SUCCESSES WILL BE
        LESS THAN X, EQUAL TO X, AND GREATER THAN X.
     2. PROBABILITY THAT THE NUMBER OF SUCCESSES WILL BE
        AT LEAST X1 BUT NOT MORE THAN X2.
     3. EXIT MODULE.
?1
```

```
    OPTION 1:  PROBABILITIES THAT THE NUMBER OF SUCCESSES (S)
               WILL BE LESS THAN X, EQUAL TO X, AND MORE THAN X.

TO EXIT ROUTINE TYPE -7777 WHEN ASKED TO INPUT X.
----------------------------------------------------------------
               BINOMIAL   DISTRIBUTION
SIZE PARAMETER N =   20                  MEAN =   12.00
PROCESS PARAMETER P =0.60 STANDARD DEVIATION =   2.191
----------------------------------------------------------------
                          X   P( S < X )   P( S=X )   P( S >X )
INPUT X.?10
                         10      0.13         0.12         0.76
INPUT X.?14
                         14      0.75         0.12         0.13
INPUT X.?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS BINOMIAL DISTRIBUTION.
     2. EVALUATE ANOTHER BINOMIAL DISTRIBUTION.
     3. EXIT MODULE.
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PROBABILITIES THAT THE NUMBER OF SUCCESSES WILL BE
        LESS THAN X, EQUAL TO X, AND GREATER THAN X.
     2. PROBABILITY THAT THE NUMBER OF SUCCESSES WILL BE
        AT LEAST X1 BUT NOT MORE THAN X2.
     3. EXIT MODULE.
?2
```

```
     OPTION 2:  PROBABILITY THAT THE NUMBER OF SUCCESSES (S)
                WILL BE AT LEAST X1 BUT NOT MORE THAN X2.

TO EXIT ROUTINE TYPE -7777 AS THE FIRST VALUE.
----------------------------------------------------------------------
               BINOMIAL   DISTRIBUTION
SIZE PARAMETER N =    20                      MEAN =    12.00
PROCESS PARAMETER P =0.60 STANDARD DEVIATION =    2.191
----------------------------------------------------------------------
INPUT X1 AND X2.?10,14
                         PROB(    10<= S <=    14 ) =0.75
INPUT X1 AND X2.?8,16
                         PROB(     8<= S <=    16 ) =0.96
INPUT X1 AND X2.?-7777,0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS BINOMIAL DISTRIBUTION.
     2. EVALUATE ANOTHER BINOMIAL DISTRIBUTION.
     3. EXIT MODULE.
?3
```

```
     COMPONENT 91.  EVALUATION OF PROBABILITY DISTRIBUTIONS

   1. NORMAL                         14. GAMMA
   2. STUDENT'S T                    15. BIVARIATE NORMAL
   3. INVERSE CHI                    16. MULTIVARIATE NORMAL
   4. INVERSE CHI-SQUARE             17. MULTIVARIATE T
   5. CHI-SQUARE                     18. DIRICHLET
   6. BETA
   7. BEHRENS FISHER
   8. SNEDECOR'S F
   9. BINOMIAL
  10. PASCAL
  11. BETA BINOMIAL
  12. BETA PASCAL
  13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?10
```

EVALUATION OF PASCAL DISTRIBUTION

THIS MODULE WILL HELP YOU EXAMINE THE CHARACTERISTICS OF A PASCAL DISTRIBUTION.

THE PASCAL DISTRIBUTION IS THE DISTRIBUTION OF THE NUMBER OF TRIALS REQUIRED TO GET S SUCCESSES WHEN THE PROBABILITY OF A SUCCESS ON ANY TRIAL IS P, THE PROCESS PARAMETER.

INPUT THE PARAMETERS OF THE PASCAL DISTRIBUTION.

INPUT THE PROCESS PARAMETER P.?.6

INPUT THE SUCCESSES PARAMETER S (MAX=200)?10

TYPE THE NUMBER OF THE OPTION YOU WANT.

1. PROBABILITIES THAT THE NUMBER (N) OF TRIALS NEEDED WILL BE LESS THAN X, EQUAL TO X, AND GREATER THAN X.
2. PROBABILITY THAT THE NUMBER (N) OF TRIALS NEEDED WILL BE BETWEEN X1 AND X2 INCLUSIVE.
3. EXIT MODULE.

?1

OPTION 1: PROBABILITIES THAT THE NUMBER (N) OF TRIALS NEEDED WILL BE LESS THAN X, EQUAL TO X, AND GREATER THAN X.

TO EXIT ROUTINE TYPE -7777 WHEN ASKED TO INPUT X.

PASCAL DISTRIBUTION

SUCCESS PARAMETER S = 10 MEAN = 16.67

PROCESS PARAMETER P = .60 STANDARD DEVIATION = 3.33

	X	P(N<X)	P(N=X)	P(N>X)
INPUT X.?20				
	20	0.814	0.059	0.128
INPUT X.?14				
	14	0.169	0.111	0.721
INPUT X.?-7777				

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER PASCAL DISTRIBUTION.
     3. EXIT MODULE.
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PROBABILITIES THAT THE NUMBER (N) OF TRIALS NEEDED
        WILL BE LESS THAN X, EQUAL TO X, AND GREATER THAN X.
     2. PROBABILITY THAT THE NUMBER (N) OF TRIALS NEEDED
        WILL BE BETWEEN X1 AND X2 INCLUSIVE.
     3. EXIT MODULE.
?2
```

```
     OPTION 2: PROBABILITY THAT THE NUMBER (N) OF TRIALS
     WILL BE BETWEEN X1 AND X2 INCLUSIVE.

TO EXIT ROUTINE TYPE -7777 AS THE FIRST VALUE.
-------------------------------------------------------------------
                 PASCAL DISTRIBUTION
SUCCESS PARAMETER S =   10         MEAN =       16.67
PROCESS PARAMETER P =  .60         STANDARD DEVIATION =  3.33
-------------------------------------------------------------------
INPUT X1 AND X2, SEPARATED BY COMMA. ?10,14
                         PROB(   10    <= N <=    14 ) =0.28
INPUT X1 AND X2, SEPARATED BY COMMA. ?14,20
                         PROB(   14    <= N <=    20 ) =0.70
INPUT X1 AND X2, SEPARATED BY COMMA. ?-7777,0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER PASCAL DISTRIBUTION.
     3. EXIT MODULE.
?3
```

```
     COMPONENT 91.  EVALUATION OF PROBABILITY DISTRIBUTIONS

  1. NORMAL                         14. GAMMA
  2. STUDENT'S T                    15. BIVARIATE NORMAL
  3. INVERSE CHI                    16. MULTIVARIATE NORMAL
  4. INVERSE CHI-SQUARE             17. MULTIVARIATE T
  5. CHI-SQUARE                     18. DIRICHLET
  6. BETA
  7. BEHRENS FISHER
  8. SNEDECOR'S F
  9. BINOMIAL
 10. PASCAL
 11. BETA BINOMIAL
 12. BETA PASCAL
 13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?11
```

```
          EVALUATION OF A BETA-BINOMIAL DISTRIBUTION

THIS MODULE WILL HELP YOU EXAMINE THE CHARACTERISTICS OF A
BETA BINOMIAL DISTRIBUTION.

X IS ASSUMED TO HAVE A BINOMIAL DISTRIBUTION WITH SAMPLE SIZE
PARAMETER N AND PROCESS (PROPORTION) PARAMETER P.
(NOTE: N MUST NOT BE GREATER THAN 200.)

P IS ASSUMED TO HAVE A BETA DISTRIBUTION WITH PARAMETERS A
AND B.

INPUT THE PARAMETERS OF THE BETA DISTRIBUTION ON THE
PARAMETER P. BOTH A AND B MUST BE 1.15 OR LARGER.

INPUT A.?2
INPUT B.?3

INPUT THE SAMPLE SIZE PARAMETER N (MAX=200).?20




TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. PROBABILITIES THAT THE NUMBER OF SUCCESSES WILL BE
         LESS THAN X, EQUAL TO X, AND GREATER THAN X.
      2. PROBABILITY THAN THE NUMBER OF SUCCESSES WILL BE
         FROM X1 THROUGH X2.
      3. END EVALUATION OF BETA-BINOMIAL DISTRIBUTION
?1
```

```
     OPTION 1:  PROBABILITIES THAT THE NUMBER OF SUCCESSES (S)
     WILL BE LESS THAN X, EQUAL TO X, AND GREATER THAN X.

TO EXIT ROUTINE TYPE -7777 WHEN ASKED TO INPUT X.
-----------------------------------------------------------------
             BETA  BINOMIAL  DISTRIBUTION
PROCESS PARAMETER P: BETA (A =    2.00 B =    3.00)
SAMPLE SIZE PARAMETER N =  20
MEAN =    8.00            STANDARD DEVIATION =    4.47
-----------------------------------------------------------------
                         X     P( S<X )     P( S=X )     P( S>X )
INPUT X.?10
                        10       0.64         0.07         0.30
INPUT X.?14
                        14       0.87         0.04         0.09
INPUT X.?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER BETA BINOMIAL DISTRIBUTION.
     3. END EVALUATION OF BETA BINOMIAL DISTRIBUTIONS.
?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. PROBABILITIES THAT THE NUMBER OF SUCCESSES WILL BE
         LESS THAN X, EQUAL TO X, AND GREATER THAN X.
      2. PROBABILITY THAN THE NUMBER OF SUCCESSES WILL BE
         FROM X1 THROUGH X2.
      3. END EVALUATION OF BETA-BINOMIAL DISTRIBUTION
?2
```

```
     OPTION 2:  PROBABILITY THAT NUMBER OF SUCCESSES (S) WILL
     AT LEAST X1 AND NOT MORE THAN X2.

TO EXIT ROUTINE TYPE -7777 AS THE FIRST VALUE.
-----------------------------------------------------------------
             BETA  BINOMIAL  DISTRIBUTION
PROCESS PARAMETER P: BETA (A =   2.00 B =   3.00)
SAMPLE SIZE PARAMETER N =  20
MEAN =   8.00            STANDARD DEVIATION =   4.47
-----------------------------------------------------------------
INPUT X1 AND X2, SEPARATED BY COMMAS.  ?5,10
                         PROB(    5 <= S <=   10 ) =0.45
INPUT X1 AND X2, SEPARATED BY COMMAS.  ?10,14
                         PROB(   10 <= S <=   14 ) =0.27
INPUT X1 AND X2, SEPARATED BY COMMAS.  ?-7777,0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER BETA BINOMIAL DISTRIBUTION.
     3. END EVALUATION OF BETA BINOMIAL DISTRIBUTIONS.
?3
```

```
     COMPONENT 91.  EVALUATION OF PROBABILITY DISTRIBUTIONS

   1. NORMAL                          14. GAMMA
   2. STUDENT'S T                     15. BIVARIATE NORMAL
   3. INVERSE CHI                     16. MULTIVARIATE NORMAL
   4. INVERSE CHI-SQUARE              17. MULTIVARIATE T
   5. CHI-SQUARE                      18. DIRICHLET
   6. BETA
   7. BEHRENS FISHER
   8. SNEDECOR'S F
   9. BINOMIAL
  10. PASCAL
  11. BETA BINOMIAL
  12. BETA PASCAL
  13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?12
```

EVALUATION OF BETA PASCAL DISTRIBUTION

```
THIS MODULE WILL HELP YOU EXAMINE THE CHARACTERISTICS OF A
BETA PASCAL DISTRIBUTION.

N IS ASSUMED TO HAVE A PASCAL DISTRIBUTION WITH
SUCCESS PARAMETER S AND PROCESS (PROPORTION) PARAMETER P.

P IS ASSUMED TO HAVE A BETA DISTRIBUTION WITH PARAMETERS A
AND B.

INPUT THE PARAMETERS OF THE BETA DISTRIBUTION ON THE PROCESS
PARAMETER P. BOTH A AND B MUST BE AT LEAST 1.15.

INPUT A.?2
INPUT B.?3

INPUT THE SUCCESS PARAMETER S.?10
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PROBABILITIES THAT THE NUMBER (N) OF TRIALS NEEDED
        WILL BE LESS THAN X, EQUAL TO X, AND GREATER THAN X.
     2. PROBABILITY THAT THE NUMBER (N) OF TRIALS NEEDED
        WILL BE BETWEEN X1 AND X2 INCLUSIVE.
     3. END EVALUATION OF BETA-PASCAL DISTRIBUTIONS.
?1
```

```
     OPTION 1: PROBABILITIES THAT THE NUMBER (N) OF TRIALS
     NEEDED WILL BE LESS THAN X, EQUAL TO X, AND GREATER THAN X.

TO EXIT ROUTINE TYPE -7777 WHEN ASKED TO INPUT X.
----------------------------------------------------------------
            BETA  PASCAL DISTRIBUTION
P DISTRIBUTED BETA ( A =     2.00     B =     3.00 )
SUCCESS PARAMETER S =  10        MEAN =  40.00
----------------------------------------------------------------
                        X     P( N<X )     P( N=X )     P( N>X )
INPUT X.?30
                       11       0.59         0.02         0.39
INPUT X.?40
                       11       0.73         0.01         0.26
INPUT X.?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER BETA PASCAL DISTRIBUTION.
     3. END EVALUATION OF BETA-PASCLAL DISTRIBUTIONS.
?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PROBABILITIES THAT THE NUMBER (N) OF TRIALS NEEDED
        WILL BE LESS THAN X, EQUAL TO X, AND GREATER THAN X.
     2. PROBABILITY THAT THE NUMBER (N) OF TRIALS NEEDED
        WILL BE BETWEEN X1 AND X2 INCLUSIVE.
     3. END EVALUATION OF BETA-PASCAL DISTRIBUTIONS.
?2
```

```
     OPTION 2: PROBABILITY THAT THE NUMBER (N) OF TRIALS
     WILL BE AT LEAST X1 AND NOT MORE THAN X2.

TO EXIT ROUTINE TYPE -7777 AS THE FIRST VALUE.
-----------------------------------------------------------------
             BETA  PASCAL DISTRIBUTION
P DISTRIBUTED BETA ( A =    2.00    B =    3.00 )
SUCCESS PARAMETER S =  10         MEAN =  40.00
-----------------------------------------------------------------
INPUT X1 AND X2.?20,30
                  PROB(   20   <= S <=   30 ) =0.28
INPUT X1 AND X2.?30,40
                  PROB(   30   <= S <=   40 ) =0.15
INPUT X1 AND X2.?-7777,0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER BETA PASCAL DISTRIBUTION.
     3. END EVALUATION OF BETA-PASCLAL DISTRIBUTIONS.
?3
```

```
     COMPONENT 91.  EVALUATION OF PROBABILITY DISTRIBUTIONS

   1. NORMAL                        14. GAMMA
   2. STUDENT'S T                   15. BIVARIATE NORMAL
   3. INVERSE CHI                   16. MULTIVARIATE NORMAL
   4. INVERSE CHI-SQUARE            17. MULTIVARIATE T
   5. CHI-SQUARE                    18. DIRICHLET
   6. BETA
   7. BEHRENS FISHER
   8. SNEDECOR'S F
   9. BINOMIAL
  10. PASCAL
  11. BETA BINOMIAL
  12. BETA PASCAL
  13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?13
```

EVALUATION OF POISSON DISTRIBUTION

THIS MODULE WILL HELP YOU EXAMINE THE CHARACTERISTICS OF A POISSON DISTRIBUTION. WHEN THE INDEX N IS LARGE AND PARAMETER PI IS SMALL IN A BINOMIAL DISTRIBUTION, IT IS APPROXIMATED BY A POISSON DISTRIBUTION WITH MEAN = N TIMES PI.

ENTER THE MEAN: POSITIVE, NOT GREATER THAN 10.?5

TYPE THE NUMBER OF THE OPTION YOU WANT.

1. PROBABILITIES THAT THE OBSERVED VALUE X WILL BE LESS THAN X0, EQUAL TO X0, AND GREATER THAN X0.
2. PROBABILITY THAT THE OBSERVED VALUE X WILL BE AT LEAST X1 BUT NOT MORE THAN X2.
3. EXIT MODULE.

?1

```
----------------------------------------------------------------
              POISSON  DISTRIBUTION
     MEAN =  5.00     STANDARD DEVIATION =  2.24
----------------------------------------------------------------

     OPTION 1:  PROBABILITIES THAT THE OBSERVED VALUE X WILL BE
                LESS THAN XO, EQUAL TO XO, AND MORE THAN XO.

TO EXIT ROUTINE TYPE -7777 WHEN ASKED TO INPUT XO.

                       XO    P(X<XO)      P(X=XO)      P(X>XO)
ENTER XO.  ?5
                        5      0.44         0.18         0.38
ENTER XO.  ?10
                       10      0.97         0.02         0.01
ENTER XO.  ?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS POISSON DISTRIBUTION.
     2. EVALUATE ANOTHER POISSON DISTRIBUTION.
     3. EXIT MODULE.
?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. PROBABILITIES THAT THE OBSERVED VALUE X WILL BE
         LESS THAN X0, EQUAL TO X0, AND GREATER THAN X0.
      2. PROBABILITY THAT THE OBSERVED VALUE X WILL BE
         AT LEAST X1 BUT NOT MORE THAN X2.
      3. EXIT MODULE.
?2
```

```
-----------------------------------------------------------------
                POISSON  DISTRIBUTION
    MEAN =  5.00     STANDARD DEVIATION =  2.24
-----------------------------------------------------------------

     OPTION 2:  PROBABILITY THAT THE OBSERVED VALUE X
                WILL BE AT LEAST X1 BUT NOT MORE THAN X2.

X1 AND X2 MUST BE INTEGERS FROM 0 TO 50,
SEPARATED BY A COMMA.
TO EXIT ROUTINE TYPE -7777 AS THE VALUE OF X1.

ENTER X1 AND X2, SEPARATED BY COMMAS.  ?0,5
                     PROB (  0 <= X <=  5 ) = 0.62
ENTER X1 AND X2, SEPARATED BY COMMAS.  ?5,10
                     PROB (  5 <= X <= 10 ) = 0.55
ENTER X1 AND X2, SEPARATED BY COMMAS.  ?-7777,0
```

TYPE THE NUMBER OF THE OPTION YOU WANT.

1. FURTHER EVALUATE THIS POISSON DISTRIBUTION.
2. EVALUATE ANOTHER POISSON DISTRIBUTION.
3. EXIT MODULE.

?3

COMPONENT 91. EVALUATION OF PROBABILITY DISTRIBUTIONS

1. NORMAL
2. STUDENT'S T
3. INVERSE CHI
4. INVERSE CHI-SQUARE
5. CHI-SQUARE
6. BETA
7. BEHRENS FISHER
8. SNEDECOR'S F
9. BINOMIAL
10. PASCAL
11. BETA BINOMIAL
12. BETA PASCAL
13. POISSON
14. GAMMA
15. BIVARIATE NORMAL
16. MULTIVARIATE NORMAL
17. MULTIVARIATE T
18. DIRICHLET

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?14

EVALUATION OF A GAMMA DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A GAMMA DISTRIBUTION. THIS IS THE SAME AS A CHI-SQUARE DISTRIBUTION EXCEPT THAT PARAMETERS ARE SPECIFIED DIFFERENTLY. A GAMMA DISTRIBUTION IS CHARACTERIZED BY INDEX Z AND SCALE PARAMETER M; A CHI-SQUARE DISTRIBUTION BY DEGREES OF FREEDOM NU AND SCALE OMEGA. THESE ARE RELATED AS FOLLOWS.
NU = 2 Z;   OMEGA = 1/(2 M);   MEAN = OMEGA X NU = Z/M.
YOU WILL BE ASKED TO ENTER Z AND M. THESE WILL BE CONVERTED INTO NU AND OMEGA. BOTH PAIRS WILL BE PRINTED FOR YOUR INFORMATION.

INPUT INDEX Z. (MIN=3 AND MAX=1000).?3

INPUT THE SCALE PARAMETER M = INDEX/MEAN. (STANDARD VALUE = .5)
?.5

TYPE THE NUMBER OF THE OPTION YOU WANT.
1. PERCENTILES
2. HIGHEST DENSITY REGIONS
3. PROBABILITY LESS THAN SOME VALUE
4. PROBABILITY BETWEEN TWO VALUES
5. GRAPH OF DENSITY FUNCTION
6. EXIT MODULE

?1

OPTION 1: PERCENTILES

```
INPUT PERCENTILE AS NUMBER FROM .5 THRU 99.5.
WHEN YOU WANT TO EXIT ROUTINE TYPE '0' FOR PERCENTILE.
---------------------------------------------------------------------------
                         GAMMA DISTRIBUTION
             INDEX Z =     3.00                   SCALE M =        0.500
DEGREES OF FREEDOM NU =    6.00               SCALE OMEGA =        1.000
                MEAN =     6.00                STAN. DEV. =        3.464
---------------------------------------------------------------------------
INPUT PERCENTILE?90
                                   90.00 PERCENTILE =        10.64
INPUT PERCENTILE?95
                                   95.00 PERCENTILE =        12.58
INPUT PERCENTILE?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER GAMMA DISTRIBUTION.
     3. EXIT MODULE
?1
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?2
```

```
        OPTION 2: P% HIGHEST DENSITY REGIONS

INPUT P% AS NUMBER FROM 5 TO 99.
WHEN YOU WANT TO EXIT ROUTINE TYPE '0' FOR P%.
-------------------------------------------------------------------
                        GAMMA DISTRIBUTION
              INDEX Z =     3.00              SCALE M =       0.500
DEGREES OF FREEDOM NU =     6.00          SCALE OMEGA =       1.000
                 MEAN =     6.00           STAN. DEV. =       3.464
-------------------------------------------------------------------
INPUT P%?90
                            90.0% HDR =(      0.88,     10.95 )
INPUT P%?95
                            95.0% HDR =(      0.61,     12.80 )
INPUT P%?0




TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER GAMMA DISTRIBUTION.
     3. EXIT MODULE
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?3
```

```
        OPTION 3: PROBABILITY LESS THAN SOME VALUE

INPUTTED VALUE MUST BE POSITIVE.
WHEN YOU WANT TO EXIT ROUTINE TYPE '0' FOR VALUE.
--------------------------------------------------------------------
                    GAMMA DISTRIBUTION
             INDEX Z =    3.00              SCALE M =       0.500
DEGREES OF FREEDOM NU =    6.00          SCALE OMEGA =       1.000
                MEAN =    6.00           STAN. DEV. =       3.464
--------------------------------------------------------------------
INPUT VALUE?10.64
                              PROB( X <      10.64 ) =0.90
                              PROB( X >      10.64 ) =0.10
INPUT VALUE?12.68
                              PROB( X <      12.68 ) =0.95
                              PROB( X >      12.68 ) =0.05
INPUT VALUE?0
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER GAMMA DISTRIBUTION.
     3. EXIT MODULE
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?4
```

```
        OPTION 4: PROBABILITY BETWEEN TWO VALUES

BOTH VALUES MUST BE GREATER THAN 0.
WHEN YOU WANT TO EXIT ROUTINE TYPE '0' FOR BOTH VALUES.
-------------------------------------------------------------------
                        GAMMA DISTRIBUTION
              INDEX Z =     3.00                SCALE M =       0.500
DEGREES OF FREEDOM NU =     6.00            SCALE OMEGA =       1.000
                 MEAN =     6.00             STAN. DEV. =       3.464
-------------------------------------------------------------------
INPUT SMALLER VALUE?.88
INPUT LARGER VALUE?10.95
                         PROB(      0.88  TO     10.95 ) = 0.90
INPUT SMALLER VALUE?.61
INPUT LARGER VALUE?12.80
                         PROB(      0.61  TO     12.80 ) = 0.95
INPUT SMALLER VALUE?0
INPUT LARGER VALUE?0




TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER GAMMA DISTRIBUTION.
     3. EXIT MODULE
?1

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITY LESS THAN SOME VALUE
     4. PROBABILITY BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?5
```

```
OPTION 5:  GRAPH OF THE DENSITY FUNCTION OVER 99% HDR
-----------------------------------------------------------------
                    GAMMA DISTRIBUTION
             INDEX Z =    3.00            SCALE M =       0.500
DEGREES OF FREEDOM NU =    6.00        SCALE OMEGA =       1.000
                MEAN =    6.00         STAN. DEV. =       3.464
-----------------------------------------------------------------
THESE ARE THE PARAMETERS OF THE DISTRIBUTION TO BE GRAPHED.
WHEN YOU ARE READY FOR THE GRAPH TO BE DISPLAYED TYPE '1'.?1
```

```
         GRAPH OF GAMMA 99.0 % HDR
    0.27 I\
    1.14 I\\\\\\\\\I\\\\\\\
    2.01 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\
    2.89 I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\\\\\I\\\\\
    3.76 I>>>>>>>>>1>>>>>>>>>2>>>>>>>>>3>>>>>>>>>4>>>>>>>>>5
    4.64 I/////////I/////////I/////////I/////////I/////////
    5.51 I/////////I/////////I/////////I/////////I/////
    6.38 I/////////I/////////I/////////I/////////
    7.26 I/////////I/////////I/////////I//
    8.13 I/////////I/////////I//////
    9.01 I/////////I/////////I/
    9.88 I/////////I//////
   10.76 I/////////I//
   11.63 I/////////
   12.50 I///////
   13.38 I/////
   14.25 I////
   15.13 I///
   16.00 I//
   16.87 I/                                CONTINUE=1?1
```

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```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION.
     2. EVALUATE ANOTHER GAMMA DISTRIBUTION.
     3. EXIT MODULE
?3
```

```
     COMPONENT 91.  EVALUATION OF PROBABILITY DISTRIBUTIONS

  1. NORMAL                          14. GAMMA
  2. STUDENT'S T                     15. BIVARIATE NORMAL
  3. INVERSE CHI                     16. MULTIVARIATE NORMAL
  4. INVERSE CHI-SQUARE              17. MULTIVARIATE T
  5. CHI-SQUARE                      18. DIRICHLET
  6. BETA
  7. BEHRENS FISHER
  8. SNEDECOR'S F
  9. BINOMIAL
 10. PASCAL
 11. BETA BINOMIAL
 12. BETA PASCAL
 13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?15
```

```
BIVARIATE NORMAL EVALUATION

PLEASE ENTER THE MEAN AND STANDARD DEVIATION OF YOUR FIRST
VARIABLE(SEPARATED BY A COMMA).?0,1

PLEASE ENTER THE MEAN AND STANDARD DEVIATION OF YOUR SECOND
VARIABLE(SEPARATED BY A COMMA).?0,1

ENTER THE CORRELATION BETWEEN THE VARIABLES (-.95 THRU .95).?.7

THIS MODULE ALLOWS YOU TO EVALUATE A BIVARIATE NORMAL
DISTRIBUTION.  YOU HAVE THE FOLLOWING OPTIONS:

        OPTIONS
        1. PROBABILITY X LESS THAN XO AND Y LESS THAN YO
        2. CONTOUR PLOT OF PDF
        3. HIGHEST DENSITY REGIONS OF PDF
        4. CONDITIONAL DISTRIBUTIONS
        5. MARGINAL DISTRIBUTIONS
        6. PLOT OF CDF
        7. RESPECIFY PARAMETERS OF THE DISTRIBUTION
        8. EXPLANATION OF OPTIONS
        9. EXIT MODULE




     INPUT THE NUMBER OF THE OPTION YOU WANT.?1
```

```
--------------------------------------------------------------
                         MEAN                    STD.DEV.
VARIABLE 1               0.000                      1.00
VARIABLE 2               0.000                      1.00
              CORRELATION IS  .7
--------------------------------------------------------------
INPUT XO AND YO(SEPARATED BY A COMMA) '-7777,-7777' TO END.?0,0
         PROB(X LESS THAN      0.00 AND Y LESS THAN      0.00)= 0.37
INPUT XO AND YO(SEPARATED BY A COMMA) '-7777,-7777' TO END.?1,1
         PROB(X LESS THAN      1.00 AND Y LESS THAN      1.00)= 0.77
INPUT XO AND YO(SEPARATED BY A COMMA) '-7777,-7777' TO END.?-7777,-7777
```

```
        OPTIONS
        1. PROBABILITY X LESS THAN XO AND Y LESS THAN YO
        2. CONTOUR PLOT OF PDF
        3. HIGHEST DENSITY REGIONS OF PDF
        4. CONDITIONAL DISTRIBUTIONS
        5. MARGINAL DISTRIBUTIONS
        6. PLOT OF CDF
        7. RESPECIFY PARAMETERS OF THE DISTRIBUTION
        8. EXPLANATION OF OPTIONS
        9. EXIT MODULE

     INPUT THE NUMBER OF THE OPTION YOU WANT.?2
```

```
ROUTINE TO PLOT SPECIFIED HIGHEST DENSITY REGIONS OF THE PDF.

---------------------------------------------------------------
                             MEAN                     STD.DEV.
VARIABLE 1                   0.000                        1.00
VARIABLE 2                   0.000                        1.00
             CORRELATION IS   .7
---------------------------------------------------------------
ENTER PERCENT PROBABILITY IN THE HDR(10 TO 90) OR -7777 TO EXIT
?90
```

```
 2.00I 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9           9
     I 9 9 9 9 9 9 9 9 9 9 9 9 9
     I 9 9 9 9 9 9 9 9 9 9 9
     I 9 9 9 9 9 9 9 9 9 9
     I 9 9 9 9 9 9 9 9
     I 9 9 9 9 9 9 9
     I 9 9 9 9 9 9                             9
     I 9 9 9 9 9                               9
     I 9 9 9 9                               9 9
     I 9 9 9 9                               9 9
 0.00I 9 9 9                               9 9 9
     I 9 9                               9 9 9 9
     I 9 9                               9 9 9 9
     I 9                               9 9 9 9 9
     I 9                             9 9 9 9 9 9
     I                             9 9 9 9 9 9 9
     I                           9 9 9 9 9 9 9 9
     I                       9 9 9 9 9 9 9 9 9 9
     I                     9 9 9 9 9 9 9 9 9 9 9
     I                 9 9 9 9 9 9 9 9 9 9 9 9 9
-2.00I 9           9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
       I-------------------I-------------------I
     -2.00               0.00                2.00
         V A R I A B L E   O N E                 TYPE '1' TO CONTINUE?1
```

ROUTINE TO PLOT SPECIFIED HIGHEST DENSITY REGIONS OF THE PDF.

```
------------------------------------------------------------
                         MEAN                     STD.DEV.
VARIABLE 1               0.000                       1.00
VARIABLE 2               0.000                       1.00
              CORRELATION IS  .7
------------------------------------------------------------
ENTER PERCENT PROBABILITY IN THE HDR(10 TO 90) OR -7777 TO EXIT
?-7777
```

```
      OPTIONS
      1. PROBABILITY X LESS THAN XO AND Y LESS THAN YO
      2. CONTOUR PLOT OF PDF
      3. HIGHEST DENSITY REGIONS OF PDF
      4. CONDITIONAL DISTRIBUTIONS
      5. MARGINAL DISTRIBUTIONS
      6. PLOT OF CDF
      7. RESPECIFY PARAMETERS OF THE DISTRIBUTION
      8. EXPLANATION OF OPTIONS
      9. EXIT MODULE

    INPUT THE NUMBER OF THE OPTION YOU WANT.?3
```

```
GIVEN ANY POINT (XO,YO), THIS ROUTINE PROVIDES THE PERCENT
PROBABILITY IN THE HIGHEST DENSITY REGION WHICH HAS (XO,YO)
ON ITS BORDER.
--------------------------------------------------------------
                         MEAN                    STD.DEV.
VARIABLE 1                0.000                      1.00
VARIABLE 2                0.000                      1.00
              CORRELATION IS  .7
--------------------------------------------------------------
INPUT XO,YO SEPARATED BY A COMMA('-7777,-7777' TO END).?1,1
THE POINT X= 1    Y= 1    IS ON THE BORDER OF THE  44.5% HIGHEST DESITY REG
INPUT XO,YO SEPARATED BY A COMMA('-7777,-7777' TO END).?2,2
THE POINT X= 2    Y= 2    IS ON THE BORDER OF THE  90.5% HIGHEST DESITY REG
INPUT XO,YO SEPARATED BY A COMMA('-7777,-7777' TO END).?-7777,-7777
```

```
OPTIONS
1. PROBABILITY X LESS THAN X0 AND Y LESS THAN Y0
2. CONTOUR PLOT OF PDF
3. HIGHEST DENSITY REGIONS OF PDF
4. CONDITIONAL DISTRIBUTIONS
5. MARGINAL DISTRIBUTIONS
6. PLOT OF CDF
7. RESPECIFY PARAMETERS OF THE DISTRIBUTION
8. EXPLANATION OF OPTIONS
9. EXIT MODULE

INPUT THE NUMBER OF THE OPTION YOU WANT.?4
```

```
ROUTINE FOR CONDITIONAL DISTRIBUTIONS
------------------------------------------------------------
                          MEAN                    STD.DEV.
VARIABLE 1                0.000                       1.00
VARIABLE 2                0.000                       1.00
              CORRELATION IS   .7
------------------------------------------------------------
INPUT THE NUMBER OF THE VARIABLE WHOSE CONDITIONAL DISTRIBUTION
YOU WANT (1 OR 2).
TYPE -7777 TO EXIT.  ?1

ENTER THE VALUE OF VARIABLE  2    WHERE YOU WANT THE CONDITIONAL ?1

 THE CONDITIONAL DISTRIBUTION OF VARIABLE 1
WITH VARIABLE 2 = 1        IS NORMAL WITH
MEAN = .7                STANDARD DEVIATION = .714143

TYPE 1 TO FURTHER EVALUATE THIS CONDITIONAL, OTHERWISE 0.  ?1
```

EVALUATION OF A NORMAL DISTRIBUTION

```
THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A
NORMAL DISTRIBUTION.

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES X IS ABOVE AND BELOW SOME VALUE
     4. PROBABILITY X IS BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?1
```

OPTION 1: PERCENTILES

```
TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT PROBABILITY AS PERCENTAGE FROM .5 THROUGH 99.5
***************************************************************
                  NORMAL DISTRIBUTION
  MEAN=    0.70                STANDARD DEVIATION =    0.71
***************************************************************

INPUT % PROBABILITY?95
                         95.0 PERCENTILE =     1.87

INPUT % PROBABILITY?97.5
                         97.5 PERCENTILE =     2.10

INPUT % PROBABILITY?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. END EVALUATION OF THIS (UNIVARIATE) DISTRIBUTION
?2
```

```
ROUTINE FOR CONDITIONAL DISTRIBUTIONS.
------------------------------------------------------------
                            MEAN                  STD.DEV.
VARIABLE 1                   0.000                    1.00
VARIABLE 2                   0.000                    1.00
              CORRELATION IS  .7
------------------------------------------------------------
INPUT THE NUMBER OF THE VARIABLE WHOSE CONDITIONAL DISTRIBUTION
YOU WANT (1 OR 2).
TYPE -7777 TO EXIT.  ?-7777
```

```
    OPTIONS
    1. PROBABILITY X LESS THAN XO AND Y LESS THAN YO
    2. CONTOUR PLOT OF PDF
    3. HIGHEST DENSITY REGIONS OF PDF
    4. CONDITIONAL DISTRIBUTIONS
    5. MARGINAL DISTRIBUTIONS
    6. PLOT OF CDF
    7. RESPECIFY PARAMETERS OF THE DISTRIBUTION
    8. EXPLANATION OF OPTIONS
    9. EXIT MODULE

  INPUT THE NUMBER OF THE OPTION YOU WANT.?5
```

```
ROUTINE FOR MARGINAL DISTRIBUTIONS
------------------------------------------------------------
                          MEAN                     STD.DEV.
VARIABLE 1                  0.000                      1.00
VARIABLE 2                  0.000                      1.00
              CORRELATION IS  .7
------------------------------------------------------------
ENTER THE NUMBER OF THE VARIABLE WHOSE MARGINAL DISTRIBUTION
YOU WANT (1 OR 2)
TYPE -7777 TO EXIT.  ?1

 THE MARGINAL DISTRIBUTION OF VARIABLE 1 IS NORMAL WITH
MEAN = 0          STANDARD DEVIATION = 1

            TYPE '1' TO FURTHER EVALUATE THIS MARGINAL ELSE '0'.?1
```

```
            EVALUATION OF A NORMAL DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A
NORMAL DISTRIBUTION.

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES X IS ABOVE AND BELOW SOME VALUE
     4. PROBABILITY X IS BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?1
```

```
            OPTION 1: PERCENTILES

TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT PROBABILITY AS PERCENTAGE FROM .5 THROUGH 99.5
***************************************************************
                 NORMAL DISTRIBUTION
  MEAN=    0.00                STANDARD DEVIATION =   1.00
***************************************************************

INPUT % PROBABILITY?95
                          95.0 PERCENTILE =     1.64

INPUT % PROBABILITY?97.5
                          97.5 PERCENTILE =     1.96

INPUT % PROBABILITY?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. END EVALUATION OF THIS (UNIVARIATE) DISTRIBUTION
?2
```

```
ROUTINE FOR MARGINAL DISTRIBUTIONS
-------------------------------------------------------------
                         MEAN                      STD.DEV.
VARIABLE 1                0.000                        1.00
VARIABLE 2                0.000                        1.00
              CORRELATION IS  .7
-------------------------------------------------------------
ENTER THE NUMBER OF THE VARIABLE WHOSE MARGINAL DISTRIBUTION
YOU WANT (1 OR 2)
TYPE -7777 TO EXIT.  ?-7777
```

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```
OPTIONS
 1. PROBABILITY X LESS THAN XO AND Y LESS THAN YO
 2. CONTOUR PLOT OF PDF
 3. HIGHEST DENSITY REGIONS OF PDF
 4. CONDITIONAL DISTRIBUTIONS
 5. MARGINAL DISTRIBUTIONS
 6. PLOT OF CDF
 7. RESPECIFY PARAMETERS OF THE DISTRIBUTION
 8. EXPLANATION OF OPTIONS
 9. EXIT MODULE

INPUT THE NUMBER OF THE OPTION YOU WANT.?6
```

```
------------------------------------------------------------
                              MEAN                    STD.DEV.
VARIABLE 1                     0.000                      1.00
VARIABLE 2                     0.000                      1.00
              CORRELATION IS   .7
------------------------------------------------------------
                                    TYPE '1' TO CONTINUE?1
```

```
 2.00 I 0 0 1 1 1 2 2 3 3 4 5 6 7 7 8 8 9 9 9 9 9
      I 0 0 1 1 1 2 2 3 3 4 5 6 7 7 8 8 9 9 9 9 9
      I 0 0 1 1 1 2 2 3 3 4 5 6 7 7 8 8 9 9 9 9 9
      I 0 0 1 1 1 2 2 3 3 4 5 6 6 7 8 8 8 9 9 9 9
      I 0 0 1 1 1 2 2 3 3 4 5 6 6 7 8 8 8 8 9 9 9
      I 0 0 1 1 1 2 2 3 3 4 5 6 6 7 7 8 8 8 8 8 8
      I 0 0 1 1 1 2 2 3 3 4 5 5 6 7 7 7 8 8 8 8 8
      I 0 0 1 1 1 2 2 3 3 4 5 5 6 6 7 7 7 7 7 7 7
      I 0 0 1 1 1 2 2 3 3 4 4 5 5 6 6 6 6 6 7 7 7
      I 0 0 1 1 1 2 2 2 3 4 4 5 5 5 5 6 6 6 6 6 6
 0.00 I 0 0 1 1 1 1 2 2 3 3 4 4 4 5 5 5 5 5 5 5 5
      I 0 0 1 1 1 1 2 2 3 3 3 4 4 4 4 4 4 4 4 4 4
      I 0 0 0 1 1 1 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3
      I 0 0 0 1 1 1 1 2 2 2 2 2 3 3 3 3 3 3 3 3 3
      I 0 0 0 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2
      I 0 0 0 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2
      I 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
      I 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
      I 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1
      I 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
-2.00 I 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
        I-------------------I-------------------I
      -2.00               0.00                 2.00
     V A R I A B L E   O N E             TYPE '1' TO CONTINUE.?1
```

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```
OPTIONS
1. PROBABILITY X LESS THAN XO AND Y LESS THAN YO
2. CONTOUR PLOT OF PDF
3. HIGHEST DENSITY REGIONS OF PDF
4. CONDITIONAL DISTRIBUTIONS
5. MARGINAL DISTRIBUTIONS
6. PLOT OF CDF
7. RESPECIFY PARAMETERS OF THE DISTRIBUTION
8. EXPLANATION OF OPTIONS
9. EXIT MODULE

INPUT THE NUMBER OF THE OPTION YOU WANT.?9
```

```
COMPONENT 91.  EVALUATION OF PROBABILITY DISTRIBUTIONS

 1. NORMAL                        14. GAMMA
 2. STUDENT'S T                   15. BIVARIATE NORMAL
 3. INVERSE CHI                   16. MULTIVARIATE NORMAL
 4. INVERSE CHI-SQUARE            17. MULTIVARIATE T
 5. CHI-SQUARE                    18. DIRICHLET
 6. BETA
 7. BEHRENS FISHER
 8. SNEDECOR'S F
 9. BINOMIAL
10. PASCAL
11. BETA BINOMIAL
12. BETA PASCAL
13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?16
```

MULTIVARIATE NORMAL EVALUATION

```
ENTER THE NUMBER OF VARIATES (P) YOU WISH TO EXAMINE (3 THRU 10) ?3
ENTER THE  3    MEANS.
ENTER THE  3    VALUES (SEPERATED BY COMMAS).
?0,0,0
YOU ENTERED THE FOLLOWING MEANS:
MEAN  1     =  0
MEAN  2     =  0
MEAN  3     =  0
IF CORRECT TYPE 1, OTHERWISE 0 TO REENTER.  ?1
```

```
ENTER THE VARIANCE COVARIANCE MATRIX WHICH IS  3    BY  3
YOU WILL ENTER IT ONE ROW AT A TIME.
NOTE:  THE MATRIX MUST BE SYMMETRIC.

ENTER  3    VALUES FOR ROW  1
ENTER THE  3    VALUES (SEPERATED BY COMMAS).
?1,.7,.7

YOU ENTERED THE FOLLOWING VALUES:
( 1    , 1    )  = 1
( 1    , 2    )  = .7
( 1    , 3    )  = .7
IF THESE ARE CORRECT TYPE 1, OTHERWISE 0 TO REENTER.  ?1

ENTER  3    VALUES FOR ROW  2
ENTER THE  3    VALUES (SEPERATED BY COMMAS).
?.7,1,.7

YOU ENTERED THE FOLLOWING VALUES:
( 2    , 1    )  = .7
( 2    , 2    )  = 1
( 2    , 3    )  = .7
IF THESE ARE CORRECT TYPE 1, OTHERWISE 0 TO REENTER.  ?1
```

```
ENTER  3    VALUES FOR ROW  3
ENTER THE  3    VALUES (SEPERATED BY COMMAS).
?.7,.7,1

YOU ENTERED THE FOLLOWING VALUES:
( 3    , 1    )  = .7
( 3    , 2    )  = .7
( 3    , 3    )  = 1
IF THESE ARE CORRECT TYPE 1, OTHERWISE 0 TO REENTER.  ?1
```

```
THIS MODULE ALLOWS YOU TO EVALUATE A MULTIVARIATE NORMAL
DISTRIBUTION FUNCTION.  YOU HAVE THE FOLLOWING OPTIONS:

     OPTIONS
        1. LIST VALUES OF PARAMETERS
        2. HIGHEST DENSITY REGIONS OF PDF
        3. CONDITIONAL DISTRIBUTIONS (UNIVARIATE)
        4. MARGINAL DISTRIBUTIONS (UNIVARIATE)
        5. RESPECIFY PARAMETERS OF THE DISTRIBUTION
        6. EXIT MODULE

ENTER THE NUMBER OF THE OPTION YOU WANT.  ?1
```

```
PARAMETER VALUES

                 MEANS
0.000      0.000      0.000

      VARIANCE/COVARIANCE MATRIX
1.000      0.700      0.700
0.700      1.000      0.700
0.700      0.700      1.000

                TYPE '1' TO CONTINUE.?1
```

```
OPTIONS
   1. LIST VALUES OF PARAMETERS
   2. HIGHEST DENSITY REGIONS OF PDF
   3. CONDITIONAL DISTRIBUTIONS (UNIVARIATE)
   4. MARGINAL DISTRIBUTIONS (UNIVARIATE)
   5. RESPECIFY PARAMETERS OF THE DISTRIBUTION
   6. EXIT MODULE

ENTER THE NUMBER OF THE OPTION YOU WANT.  ?2
```

```
THIS ROUTINE PROVIDES THE PER CENT HIGHEST DENSITY REGION
ON WHOSE SURFACE A SPECIFIED P-DIMENSIONAL POINT RESIDES.

ENTER  3    VALUES. TO EXIT TYPE -7777 AS FIRST VALUE.
ENTER THE  3    VALUES (SEPERATED BY COMMAS).
?1,1,1

     THE POINT DEFINED BY THE FOLLOWING VALUES:
 1     1     1
IS ON THE SURFACE OF THE 25.9% HIGHEST DESITY REGION

ENTER  3    VALUES. TO EXIT TYPE -7777 AS FIRST VALUE.
ENTER THE  3    VALUES (SEPERATED BY COMMAS).
?2,2,2

     THE POINT DEFINED BY THE FOLLOWING VALUES:
 2     2     2
IS ON THE SURFACE OF THE 82.8% HIGHEST DESITY REGION

ENTER  3    VALUES. TO EXIT TYPE -7777 AS FIRST VALUE.
ENTER THE  3    VALUES (SEPERATED BY COMMAS).
?-7777,0,0




     OPTIONS
        1. LIST VALUES OF PARAMETERS
        2. HIGHEST DENSITY REGIONS OF PDF
        3. CONDITIONAL DISTRIBUTIONS (UNIVARIATE)
        4. MARGINAL DISTRIBUTIONS (UNIVARIATE)
        5. RESPECIFY PARAMETERS OF THE DISTRIBUTION
        6. EXIT MODULE

ENTER THE NUMBER OF THE OPTION YOU WANT.  ?3
```

ROUTINE FOR CONDITIONAL DISTRIBUTIONS

```
THIS OPTION ENABLES YOU TO STUDY UNIVARIATE CONDITIONALS.
TYPE THE NUMBER OF THE VARIABLE WHOSE CONDITIONAL YOU WANT.
TO EXIT THIS OPTION TYPE -7777.  ?1
ENTER VALUES FOR THE FOLLOWING:
VARIABLE  2
?0
VARIABLE  3
?1
```

```
YOU HAVE CONDITIONALIZED AT THE FOLLOWING VALUES :

VARIABLE  2      = 0
VARIABLE  3      = 1

THE DISTRIBUTION OF VARIABLE  1     IS UNIVARIATE NORMAL WITH
         MEAN =       0.41       STANDARD DEVIATION =        0.65

         TYPE '1' TO FURTHER EVALUATE THIS CONDITIONAL ELSE '0'?1
```

814

EVALUATION OF A NORMAL DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A NORMAL DISTRIBUTION.

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES X IS ABOVE AND BELOW SOME VALUE
     4. PROBABILITY X IS BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?1
```

OPTION 1: PERCENTILES

```
TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT PROBABILITY AS PERCENTAGE FROM .5 THROUGH 99.5
****************************************************************
                  NORMAL DISTRIBUTION
 MEAN=    0.41                STANDARD DEVIATION =    0.65
****************************************************************

INPUT % PROBABILITY?50
                         50.0 PERCENTILE =    0.41

INPUT % PROBABILITY?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. END EVALUATION OF THIS (UNIVARIATE) DISTRIBUTION
?2
```

```
ROUTINE FOR CONDITIONAL DISTRIBUTIONS

THIS OPTION ENABLES YOU TO STUDY UNIVARIATE CONDITIONALS.
TYPE THE NUMBER OF THE VARIABLE WHOSE CONDITIONAL YOU WANT.
TO EXIT THIS OPTION TYPE -7777.  ?-7777
```

```
OPTIONS
    1. LIST VALUES OF PARAMETERS
    2. HIGHEST DENSITY REGIONS OF PDF
    3. CONDITIONAL DISTRIBUTIONS (UNIVARIATE)
    4. MARGINAL DISTRIBUTIONS (UNIVARIATE)
    5. RESPECIFY PARAMETERS OF THE DISTRIBUTION
    6. EXIT MODULE

ENTER THE NUMBER OF THE OPTION YOU WANT.  ?4
```

```
ROUTINE FOR MARGINAL DISTRIBUTIONS

THIS OPTION ENABLES YOU TO EXAMINE UNIVARIATE MARGINALS.
ENTER THE NUMBER OF THE VARIABLE WHOSE MARGINAL YOU WANT.
TYPE -7777 TO EXIT THIS OPTION.  ?1

MARGINAL DISTRIBUTION OF VARIABLE  1    IS UNIVARIATE NORMAL WITH
         MEAN =      0.00       STANDARD DEVIATION =       1.00

            TYPE '1' TO FURTHER EVALUATE THIS MARGINAL ELSE '0'.?1
```

```
              EVALUATION OF A NORMAL DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A
NORMAL DISTRIBUTION.

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. PERCENTILES
     2. HIGHEST DENSITY REGIONS
     3. PROBABILITIES X IS ABOVE AND BELOW SOME VALUE
     4. PROBABILITY X IS BETWEEN TWO VALUES
     5. GRAPH OF DENSITY FUNCTION
     6. EXIT MODULE
?1
```

```
               OPTION 1: PERCENTILES

TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT PROBABILITY AS PERCENTAGE FROM .5 THROUGH 99.5
****************************************************************
                   NORMAL DISTRIBUTION
  MEAN=    0.00                STANDARD DEVIATION =   1.00
****************************************************************

INPUT % PROBABILITY?95
                         95.0 PERCENTILE =    1.64

INPUT % PROBABILITY?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. END EVALUATION OF THIS (UNIVARIATE) DISTRIBUTION
?2
```

```
ROUTINE FOR MARGINAL DISTRIBUTIONS

THIS OPTION ENABLES YOU TO EXAMINE UNIVARIATE MARGINALS.
ENTER THE NUMBER OF THE VARIABLE WHOSE MARGINAL YOU WANT.
TYPE -7777 TO EXIT THIS OPTION.  ?-7777
```

```
OPTIONS
   1. LIST VALUES OF PARAMETERS
   2. HIGHEST DENSITY REGIONS OF PDF
   3. CONDITIONAL DISTRIBUTIONS (UNIVARIATE)
   4. MARGINAL DISTRIBUTIONS (UNIVARIATE)
   5. RESPECIFY PARAMETERS OF THE DISTRIBUTION
   6. EXIT MODULE

ENTER THE NUMBER OF THE OPTION YOU WANT.  ?6
```

```
     COMPONENT 91.  EVALUATION OF PROBABILITY DISTRIBUTIONS

  1. NORMAL                          14. GAMMA
  2. STUDENT'S T                     15. BIVARIATE NORMAL
  3. INVERSE CHI                     16. MULTIVARIATE NORMAL
  4. INVERSE CHI-SQUARE              17. MULTIVARIATE T
  5. CHI-SQUARE                      18. DIRICHLET
  6. BETA
  7. BEHRENS FISHER
  8. SNEDECOR'S F
  9. BINOMIAL
 10. PASCAL
 11. BETA BINOMIAL
 12. BETA PASCAL
 13. POISSON

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?17
```

```
        MULTIVARIATE T EVALUATION

ENTER THE NUMBER OF VARIATES (P) YOU WISH TO EXAMINE (2-10).?3

ENTER THE DEGREES OF FREEDOM (DF): MIN = 3, MAX = 100.  ?3

ENTER THE MEANS OF THE  3    VARIABLES.
ENTER THE  3    VALUES (SEPARATED BY COMMAS).
?0,0,0
YOU ENTERED THE FOLLOWING MEANS:
MEAN  1     =  0
MEAN  2     =  0
MEAN  3     =  0
IF CORRECT TYPE 1, OTHERWISE TYPE 0 TO REENTER.?1

IN THE CONTEXT OF THE MULTIVARIATE T DISTRIBUTION, DIAGONAL
ELEMENTS OF THE VARIANCE-COVARIANCE MATRIX HAVE THE FOLLOWING
MEANING. LET S1**2 BE THE (1,1) ELEMENT OF THE MATRIX. THEN THE
MARGINAL DISTRIBUTION OF (VARIABLE 1)/S1 IS A STANDARD T. HENCE
THE MARGINAL VARIANCE OF VARIABLE 1 IS DF*S1**2/(DF-2).

MOREOVER, EVEN IF ALL CORRELATIONS ARE ZERO, CONDITIONAL VARIANCE
WILL DEPEND ON THE VALUES OF OTHER VARIABLES.

ENTER THE  3    BY  3    MATRIX, ONE ROW AT A TIME.
NOTE: THE MATRIX MUST BE SYMMETRIC.

ENTER  3    VALUES FOR ROW  1
ENTER THE  3    VALUES (SEPARATED BY COMMAS).
?1,.7,.7

YOU ENTERED THE FOLLOWING VALUES:
( 1    , 1    )  = 1
( 1    , 2    )  = .7
( 1    , 3    )  = .7
       IF THESE ARE CORRECT TYPE '1' ELSE '0' TO REENTER.?1

ENTER  3    VALUES FOR ROW  2
ENTER THE  3    VALUES (SEPARATED BY COMMAS).
```

```
?.7,1,.7

YOU ENTERED THE FOLLOWING VALUES:
( 2     , 1     )  = .7
( 2     , 2     )  = 1
( 2     , 3     )  = .7
       IF THESE ARE CORRECT TYPE '1' ELSE '0' TO REENTER.?1

ENTER  3    VALUES FOR ROW  3
ENTER THE  3    VALUES (SEPARATED BY COMMAS).
?.7,.7,1

YOU ENTERED THE FOLLOWING VALUES:
( 3     , 1     )  = .7
( 3     , 2     )  = .7
( 3     , 3     )  = 1
       IF THESE ARE CORRECT TYPE '1' ELSE '0' TO REENTER.?1
```

```
THIS MODULE ALLOWS YOU TO EVALUATE A MULTIVARIATE T
DISTRIBUTION FUNCTION.  YOU HAVE THE FOLLOWING OPTIONS:

     OPTIONS
        1. LIST VALUES OF PARAMETERS
        2. HIGHEST DENSITY REGIONS OF PDF
        3. CONDITIONAL DISTRIBUTIONS (UNIVARIATE)
        4. MARGINAL DISTRIBUTIONS (UNIVARIATE)
        5. RESPECIFY PARAMETERS OF THE DISTRIBUTION
        6. EXIT MODULE

ENTER THE NUMBER OF THE OPTION YOU WANT.  ?2
```

```
THIS ROUTINE PROVIDES THE PER CENT HIGHEST DENSITY REGION
ON WHOSE SURFACE A SPECIFIED P-DIMENSIONAL POINT RESIDES.

ENTER THE  3    VALUES. TO EXIT TYPE -7777 AS FIRST VALUE.
ENTER THE  3    VALUES (SEPARATED BY COMMAS).
?1,1,1
     THE POINT DEFINED BY THE FOLLOWING VALUES:
               1
               1
               1

IS ON THE SURFACE OF THE  7.0% HIGHEST DESITY REGION

ENTER THE  3    VALUES. TO EXIT TYPE -7777 AS FIRST VALUE.
ENTER THE  3    VALUES (SEPARATED BY COMMAS).
?2,2,2
     THE POINT DEFINED BY THE FOLLOWING VALUES:
               2
               2
               2

IS ON THE SURFACE OF THE 32.1% HIGHEST DESITY REGION

ENTER THE  3    VALUES. TO EXIT TYPE -7777 AS FIRST VALUE.




ENTER THE  3    VALUES (SEPARATED BY COMMAS).
?-7777,0,0
```

```
OPTIONS
     1. LIST VALUES OF PARAMETERS
     2. HIGHEST DENSITY REGIONS OF PDF
     3. CONDITIONAL DISTRIBUTIONS (UNIVARIATE)
     4. MARGINAL DISTRIBUTIONS (UNIVARIATE)
     5. RESPECIFY PARAMETERS OF THE DISTRIBUTION
     6. EXIT MODULE

ENTER THE NUMBER OF THE OPTION YOU WANT.  ?3
```

```
ROUTINE FOR CONDITIONAL DISTRIBUTIONS

THIS OPTION ENABLES YOU TO STUDY UNIVARIATE CONDITIONALS.
TYPE THE NUMBER OF THE VARIABLE WHOSE CONDITIONAL YOU WANT.
TYPE -7777 TO EXIT THIS OPTION.  ?1

NOW ENTER VALUES FOR THE OTHER VARIABLES, ONE PER LINE.
VARIABLE  2      ?0
VARIABLE  3      ?1
```

```
YOU HAVE CONDITIONALIZED AT THE FOLLOWING VALUES:

VARIABLE  2      = 0
VARIABLE  3      = 1

CONDITIONAL DISTRIBUTION OF VARIABLE  1    IS STUDENT'S T WITH

          MEAN =       0.41         STANDARD DEVIATION =        0.84
               DEGREES OF FREEDOM =      5

TYPE '1' TO FURTHER EVALUATE THIS CONDITIONAL, OTHERWISE '0'  ?1
```

```
          EVALUATION OF A STUDENT'S T DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A
STUDENT'S T DISTRIBUTION.

TYPE THE NUMBER OF THE OPTION YOU WANT.
        1. PERCENTILES
        2. HIGHEST DENSITY REGIONS
        3. PROBABILITIES T IS ABOVE AND BELOW SOME VALUE
        4. PROBABILITY T IS BETWEEN TWO VALUES
        5. PERCENTILES FOR TRUNCATED T DISTRIBUTION
        6. GRAPH OF THE DENSITY FUNCTION
        7. END EVALUATION OF T DISTRIBUTION

?1
```

```
        OPTION 1: PERCENTILES

TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT PROBABILITY AS PERCENTAGE FROM .5 THROUGH 99.5.
------------------------------------------------------------------
               STUDENT'S T DISTRIBUTION
DEGREES OF FREEDOM =      5.00                 MEAN =      0.41
SCALE PARAMETER    =      2.10   STANDARD DEVIATION =      0.84
------------------------------------------------------------------
INPUT % PROBABILITY
?95
                          95.00 PERCENTILE =     1.72
INPUT % PROBABILITY
?-7777
```

```
TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. END EVALUATION OF THIS DISTRIBUTION
?2
```

```
ROUTINE FOR CONDITIONAL DISTRIBUTIONS

THIS OPTION ENABLES YOU TO STUDY UNIVARIATE CONDITIONALS.
TYPE THE NUMBER OF THE VARIABLE WHOSE CONDITIONAL YOU WANT.
TYPE -7777 TO EXIT THIS OPTION.  ?-7777
```

```
      OPTIONS
         1. LIST VALUES OF PARAMETERS
         2. HIGHEST DENSITY REGIONS OF PDF
         3. CONDITIONAL DISTRIBUTIONS (UNIVARIATE)
         4. MARGINAL DISTRIBUTIONS (UNIVARIATE)
         5. RESPECIFY PARAMETERS OF THE DISTRIBUTION
         6. EXIT MODULE

ENTER THE NUMBER OF THE OPTION YOU WANT.  ?4
```

```
ROUTINE FOR MARGINAL DISTRIBUTIONS

THIS OPTION ENABLES YOU TO STUDY UNIVARIATE MARGINAL DISTRIBUTIONS
ENTER THE NUMBER OF THE VARIABLE WHOSE MARGINAL YOU WANT.
TYPE -7777 TO EXIT THIS OPTION.  ?1
MARGINAL DISTRIBUTION OF VARIABLE  1    IS UNIVARIATE T WITH

          MEAN =       0.00       STANDARD DEVIATION =        1.73
               DEGREES OF FREEDOM =        3

TYPE '1' TO FURTHER EVALUATE THIS MARGINAL, OTHERWISE '0'.  ?1
```

```
          EVALUATION OF A STUDENT'S T DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A
STUDENT'S T DISTRIBUTION.

TYPE THE NUMBER OF THE OPTION YOU WANT.
        1. PERCENTILES
        2. HIGHEST DENSITY REGIONS
        3. PROBABILITIES T IS ABOVE AND BELOW SOME VALUE
        4. PROBABILITY T IS BETWEEN TWO VALUES
        5. PERCENTILES FOR TRUNCATED T DISTRIBUTION
        6. GRAPH OF THE DENSITY FUNCTION
        7. END EVALUATION OF T DISTRIBUTION

?1
```

```
      OPTION 1: PERCENTILES

TO EXIT ROUTINE TYPE -7777 WHEN ASKED FOR INPUT.
INPUT PROBABILITY AS PERCENTAGE FROM .5 THROUGH 99.5.
-------------------------------------------------------------
              STUDENT'S T DISTRIBUTION
DEGREES OF FREEDOM =       3.00                  MEAN =      0.00
SCALE PARAMETER    =       3.00   STANDARD DEVIATION =      1.73
-------------------------------------------------------------
INPUT % PROBABILITY
?95
                          95.00 PERCENTILE =    2.36
INPUT % PROBABILITY
?-7777

TYPE THE NUMBER OF THE OPTION YOU WANT.
     1. FURTHER EVALUATE THIS DISTRIBUTION
     2. END EVALUATION OF THIS DISTRIBUTION
?2
```

```
ROUTINE FOR MARGINAL DISTRIBUTIONS

THIS OPTION ENABLES YOU TO STUDY UNIVARIATE MARGINAL DISTRIBUTIONS
ENTER THE NUMBER OF THE VARIABLE WHOSE MARGINAL YOU WANT.
TYPE -7777 TO EXIT THIS OPTION.  ?-7777
```

```
     OPTIONS
        1. LIST VALUES OF PARAMETERS
        2. HIGHEST DENSITY REGIONS OF PDF
        3. CONDITIONAL DISTRIBUTIONS (UNIVARIATE)
        4. MARGINAL DISTRIBUTIONS (UNIVARIATE)
        5. RESPECIFY PARAMETERS OF THE DISTRIBUTION
        6. EXIT MODULE

ENTER THE NUMBER OF THE OPTION YOU WANT.  ?6
```

COMPONENT 91. EVALUATION OF PROBABILITY DISTRIBUTIONS

1. NORMAL
2. STUDENT'S T
3. INVERSE CHI
4. INVERSE CHI-SQUARE
5. CHI-SQUARE
6. BETA
7. BEHRENS FISHER
8. SNEDECOR'S F
9. BINOMIAL
10. PASCAL
11. BETA BINOMIAL
12. BETA PASCAL
13. POISSON
14. GAMMA
15. BIVARIATE NORMAL
16. MULTIVARIATE NORMAL
17. MULTIVARIATE T
18. DIRICHLET

TYPE THE NUMBER OF THE DISTRIBUTION THAT YOU WANT (ELSE '0')?18

STUDY OF DIRICHLET (MULTIVARIATE BETA) DISTRIBUTION

```
ENTER NUMBER OF CATEGORIES IN YOUR DIRICHLET DISTRIBUTION(2-10)  ?3
ENTER THE PARAMETER FOR EACH CATEGORY (MIN=2).
CATEGORY  1           ?5
CATEGORY  2           ?10
CATEGORY  3           ?15
YOU ENTERED THE FOLLOWING VALUES:
CATEGORY  1    :  PARAMETER =  5
CATEGORY  2    :  PARAMETER =  10
CATEGORY  3    :  PARAMETER =  15
IF CORRECT TYPE '1', OTHERWISE '0' TO REENTER.  ?1
```

```
THIS MODULE HELPS YOU TO STUDY A DIRICHLET DISTRIBUTION.

     OPTIONS
         1. LIST VALUES OF PARAMETERS
         2. MARGINAL DISTRIBUTIONS (UNIVARIATE)
         3. RESPECIFY PARAMETERS OF THE DISTRIBUTION
         4. EXIT MODULE

ENTER THE NUMBER OF THE OPTION YOU WANT.   ?2
```

```
ROUTINE FOR MARGINAL DISTRIBUTIONS

YOUR PARAMETERS FOR THE CATEGORIES ARE

     1       2       3
   5.00   10.00   15.00

THIS OPTION ENABLES YOU TO EXAMINE UNIVARIATE MARGINALS.
ENTER THE NUMBER OF THE CATEGORY WHOSE MARGINAL YOU WANT.
TYPE -7777 TO EXIT THIS OPTION.  ?1
```

MARGINAL DISTRIBUTIONS

MARGINAL DISTRIBUTION OF VARIABLE 1 IS UNIVARIATE BETA WITH

A = 5.00 B = 25.00

MEAN = 0.167 STANDARD DEVIATION = 0.067

MODE = 0.14

TYPE '1' TO FURTHER EVALUATE THIS MARGINAL, OTHERWISE '0'. ?1

EVALUATION OF A BETA DISTRIBUTION

THIS MODULE ALLOWS YOU TO EXAMINE THE CHARACTERISTICS OF A BETA DISTRIBUTION.

TYPE THE NUMBER OF THE OPTION YOU WANT.

1. PERCENTILES
2. HIGHEST DENSITY REGIONS
3. PROBABILITY PI IS LESS THAN SOME VALUE
4. PROBABILITY PI IS BETWEEN TWO VALUES
5. GRAPH OF THE DENSITY FUNCTION
6. END EVALUATION OF BETA DISTRIBUTION

?1

```
          OPTION 1: PERCENTILES

TO EXIT ROUTINE TYPE '0' WHEN ASKED FOR INPUT.
INPUT PERCENTILES AS NUMBERS FROM .5 THROUGH 99.5.
------------------------------------------------------------
BETA            A=   5.00        B=  25.00
           MEAN=0.17   ST. DEV.=0.0669
------------------------------------------------------------

INPUT PERCENTILE?95
                                 95.0% = 0.29
INPUT PERCENTILE?0




TYPE THE NUMBER OF THE OPTION YOU WANT.
      1. FURTHER EVALUATE THIS DISTRIBUTION
      2. END EVALUATION OF THIS DISTRIBUTION
?2
```

```
ROUTINE FOR MARGINAL DISTRIBUTIONS

YOUR PARAMETERS FOR THE CATEGORIES ARE

     1       2       3
   5.00   10.00   15.00

THIS OPTION ENABLES YOU TO EXAMINE UNIVARIATE MARGINALS.
ENTER THE NUMBER OF THE CATEGORY WHOSE MARGINAL YOU WANT.
TYPE -7777 TO EXIT THIS OPTION.  ?-7777
```

```
     OPTIONS
        1. LIST VALUES OF PARAMETERS
        2. MARGINAL DISTRIBUTIONS (UNIVARIATE)
        3. RESPECIFY PARAMETERS OF THE DISTRIBUTION
        4. EXIT MODULE

ENTER THE NUMBER OF THE OPTION YOU WANT.  ?4
```